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THEORY AND PRACTICE

OF THE

MOVEMENT-CURE:

OR, THE

TREATMENT OF LATERAL CURVATURE OF THE SPINE; PARALYSIS; INDIGESTION; CONSTIPATION; CONSUMPTION; ANGULAR CURVATURES, AND OTHER DEFORMITIES; DISEASES INCIDENT TO WOMEN; DERANGEMENTS OF THE NERVOUS SYSTEM; AND OTHER CHRONIC AFFECTIONS,

BY THE

SWEDISH SYSTEM

OF

LOCALIZED MOVEMENTS.

BY

CHARLES FAYETTE TAYLOR, M.D.

With Illustrations.

PHILADELPHIA:
LINDSAY & BLAKISTON.
1861.

Entered, according to Act of Congress, in the year 1860, by

CHARLES FAYETTE TAYLOR,

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TO

BARON WILLIAM DE WETTERSTEDT,

MINISTER RESIDENT FROM SWEDEN AND NORWAY TO THE UNITED STATES,

AS A

TOKEN OF PERSONAL REGARD,

AND AS

AN EXPRESSION OF GRATITUDE TO THE COUNTRY HE REPRESENTS, WHICH HAS PRODUCED, NOT LEAST AMONG HER SONS OF UNPRETENTIOUS GREATNESS,

WITH A CELSIUS, A LINNÆUS, A BERZELIUS, AND A RETZIUS,

PETER HENRY LING,

POET AND PHILOSOPHER,

TO TEACH US NOT ONLY TO DESPISE EFFEMINACY, AND TO EMULATE THE PHYSICAL NOBLENESS OF

THE OLD NORSE HEROES,

BUT TO

BANISH DISEASE BY THE BEAUTIFUL SYSTEM HE ORIGINATED,

This Book

IS RESPECTFULLY DEDICATED

BY

THE AUTHOR.

PREFACE.

I MAKE no apology for bringing a new book on a new subject before the medical profession. There is need of information on the subject of which it treats; and that this need is felt is shown by the numerous inquiries directed to me by physicians from all parts of the country, and by the hearty encouragement extended to me by the profession of this city.

Having made the somewhat hazardous attempt to introduce a new and distinct practice—and that a specialty—it is gratifying to know that the Movement-Cure treatment has met with the cordial approbation of every physician whose attention has been directed to its merits.

It is to supply an apparent demand that this work—which at best can be considered as but an incomplete elucidation of the subject—has been prepared.

In this circumscribed but new field of medical inquiry there is a rich harvest to reward patient investigation. Such investigation I in-

tend to continue; and at a future day, with ampler material, I hope to give to the profession a work of more lasting value than this unpretending book. But, till a better one is written, the present volume is respectfully submitted.

CHARLES FAYETTE TAYLOR.

NEW YORK, *December*, 1860.

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THEORY AND PRACTICE

OF THE

MOVEMENT-CURE.

THE MOVEMENT-CURE.

First Part.

PHYSIOLOGICAL.

CHAPTER I.

THE NUTRITIVE PROCESSES.

Conditions of Nutrition — Tissue Formation analogous to Excretion — Tissue Transformation necessary to Purity of the Blood — Digestion not Nutrition — Muscular Motion promotes Tissue Transformation—Causes Oxydation of the Tissues — Increases Affinity between the Blood and Oxygen of Respiration—Circulation governed by Muscular Action, Endosmotic as well as Capillary—Functions are performed only by presence of Arterial Blood — Regulation of Functions by controlling the Circulation — Influence of the Nervous System — Vegetative and Animal Life—Direct and Reflex Action—Medical Uses of these—Mental Influence—Can be made Remedial — Tissue Metamorphoses caused by Muscular Action not in the Ratio of Fatigue—Relative Action of Muscular and Nervous Systems—Muscular and Nervous Fatigue different—They are partially Separable.

In proposing any new method of medical treatment, the first inquiry should be, whether it is in accordance with, or antagonistic to, physiological laws, for all legitimate remedial means are employed because of their assumed ability of so modifying the processes of nutrition, that a more healthful action shall take the place of a diseased one. Hence, any means which can do this must be remedial. In the endeavor to see how far these processes of nutrition can be controlled by purely mechanical agencies and the dynamic powers

within us, without the aid of chemical means, it becomes necessary to look at some of the conditions under which these processes take place. It may be said that proper corporeal nutrition constitutes perfect health. Passing by those important and interesting processes of digestion, absorption, etc., by nutrition, I refer to those interstitial changes by which the integrity of our tissues is maintained against the destructive agencies of time, and the wear and tear occasioned by those functional activities common to all animal organisms. The conditions necessary for this proper nutrition seem to be :

First. A right state and composition of the blood, or other nutrient material.* That vital endowment of the cell-structure of every tissue and organ, by which they select from the blood only those materials necessary for their peculiar structures, is the most perfect arrangement by which the blood itself is constantly kept at its greatest purity. The law of Treviranus is, that "each part of the body, in respect of its nutrition, stands to the whole body in the relation of an excreted substance."† In this sense we may say that the nutrition of any one tissue is a purifier of the blood for the uses of all other tissues.

Abundant illustrations of this principle can be seen on a little reflection. The amount of carbonate of lime contained in the fluids of an oyster or snail would

* Paget.

† Carpenter's Principles of Human Physiology, p. 327. Paget's Surgical Pathology, p. 21.

seriously interfere with the development of the other tissues of these mollusca, were it not elaborated in the form of shell. In those that have no shell, it forms a simple secretion from their fluids, which is washed away by the waters. So of the carbonates, phosphates, and other components of animal bone; if they were not selected from the blood in the formation of osseous tissue, but were allowed to remain as a component part of the circulating fluid, they must wholly unfit it for the proper nutrition of other tissues. The same principle must hold good with regard to all tissues; the muscle as well as bone, selecting from the common blood those materials which, remaining, would be inimical to the best development of other structures. This mutual interdependence of function upon function, and organ upon organ, is well illustrated by such organs as the kidneys.

It is said that if, in a healthy man, the secretion from the kidneys be suddenly suspended, he can not live much beyond seventy hours. In that time the urea which has accumulated in the blood is sufficient to destroy life, by its interference with organic processes. It is true that the kidneys are excreting organs, and that the substance separated by them from the blood has already been used in formative processes, and is now on its downward course toward inorganic compounds; but the process by which this selective separation is performed, is as much a functional act of cell-formation as the nutrition of muscle or nerve—only the resulting products are different.

Even from the partial suspension of any of the nutritive processes—as of the muscular, when an active man is obliged to suspend activity; or of the sanguineous, when a large arterial trunk is tied—there is always more or less disturbance of the system, arising from deterioration of blood from this cause. Every interstitial process, whether of secretion, excretion, innervation, or new formation, may be called nutrition, for all of these are themselves processes of cell-growth. But the only manner by which any part or organ can be maintained in its integrity, is by the performance of that particular function for which it was specially created. A function itself has reference to all other organs; the *performing* of the function is self-reparative to the organ performing it.

Those progressive and regressive* molecular changes occurring in every tissue, simultaneously with every functional act, have relation to the purity and right condition of the blood, not only by selecting from the blood those materials necessary to the proper nutrition of every tissue, thereby preparing a more perfect plasma for other tissue formations, but the blood itself is thus enabled to perfect its own organization.

The blood, if not a tissue, is at least an organ, having its own progressive and regressive processes, subject to all the liabilities of other organs, and whose special function it is to carry nutrition to the other tissues, and bring back, for purification or excretion, the general waste. But if tissue transformation take

* Lehmann.

place inadequately, the blood, independent of all other considerations, must deteriorate from sheer want of opportunity to perform its special function, upon the performance of which, as with all other organs, its healthy condition depends. It is tied up, as it were, like a bandaged limb, and languishes for the want of something to do.

It has been said that, "when we have the most perfect health, we die the fastest;" that is, in the most perfect nutrition, molecular death takes place the most rapidly, in consequence of the great functional activity; all of which, as before stated, are accompanied by progressive and regressive metamorphoses. All these influences upon healthy nutrition, as well as that exercised through the nervous system—which will be considered further on—take place entirely independent of the mere act of *digestion* of food, which is simply the first steps of the preparation of *material* for nutrition, but is not of itself a nutritive act. Thus we see the importance to the physician of understanding all the conditions under which nutrition or molecular transformation takes place. He will also begin to appreciate how important, in disease, it is to be able to control these processes in accordance with the indications of the case. That he can exercise control within certain limits, must be apparent, when we reflect that at least *one half* of the gross weight of the body is muscular tissue; and from the great supply of blood to muscle in active use it is probable that, with ordinary activity, *three fourths* of the aliment

taken into the body goes to supply the voluntary muscular system, over which we have entire control. The *amount* and *direction* of muscular nutrition depend entirely upon the amount and direction of the muscular motions which we employ; for every motion is the result of the calling into action of muscular contractility—which is the only function of muscle—with its accompanying formative progressive and regressive changes, the material for which is furnished by the increased supply of blood induced by the muscular action.

But perhaps the most important of all the results of muscular motion is the increased *oxydation* of the tissues, and the consequent increased introduction of oxygen through the lungs. Not that the respiration is necessarily accelerated, but that the *affinity* of the blood for oxygen is increased in the ratio of the tissue metamorphoses, consequent on the muscular contraction.

Now, when it is recollected that in *all* diseases the introduction of oxygen is always less than in health—because the transformation of tissue is always less—it will be seen how important a part this increased oxydation must have in the cure of disease. Lehmann says: "There are no acute and but few chronic diseases in which the oxydation of the constituents of the blood is not diminished or impeded;" and again: "There is no disease characterized by too rapid or too sudden oxydation of the blood."* Since oxygen plays an essential part in all vital manifestations, and

* Lehmann's Physiological Chemistry, p. 199.

since all diseases are characterized by a *deficiency* of that element, and since muscular contraction is a function requiring a large supply of oxygen for its manifestation—urea, the result of muscle-oxydation, being abundant after muscular exertion—it follows that this presents very proper conditions for the correcting of those states of the system depending on imperfect oxydation of the blood and tissues, by favoring a larger introduction of that element.

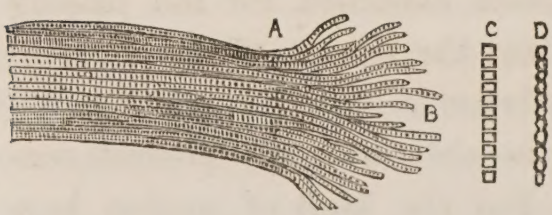
Thus it will be seen that, at least as far as the muscular system is concerned, comprising the great mass of all nutrition, we *do* have intimate control of all the molecular transformations. It will be seen, by-and-by, that we can influence the *quality* of those changes as well as their amount and direction. And thus, in so far as the purity of the blood depends on the nutrition of the muscular system, according to the preceding view, we are enabled to exercise a most important and controlling influence.

In the second place, a proper *circulation* of the nutrient fluids is essential to perfect nutrition in this connection. By proper circulation it is not meant that which takes place in the vessels by virtue of the heart's action, for rapid circulation in the *vessels* merely is an unfavorable condition for the passing out from the vessels into the tissues, of the nutrient material. Rapid circulation is indeed a symptom of diseased action, and co-exists with the poorest condition of nutrition. But the kind of motion here referred to is that which takes place in and among

the tissues as a consequence, directly or indirectly, of change of their substance involved in every functional act. Motion is an essential quality of all organized bodies. Indeed, we can not conceive of any, even the very lowest organisms, before there are either nerves or special organs of motion, where molecular movements are not only essential to the development and growth, but even the existence of the organism. What is life itself but the capability of specific motions that enables certain elements of matter to assume certain forms? In the lowest forms of animal life this capability of motion or nutrition is entirely confined to cell-endosmose and exosmose. It is still the same in the higher orders of animal life, but with the circulation in the vessels superadded. Still, it is estimated that the quantity of the fluids circulating *outside* of the blood-vessels is as great as that within them.

The proper circulation of the fluids by endosmose is as important as the proper circulation of the blood in the vessels, and both are indispensable to perfect nutrition. The following cuts, from "Peaslee's Human Histology," will sufficiently illustrate the formation of the muscular and elastic tissues, and the blood capillaries, with which we have more particularly at present to deal.

FIG. 1.

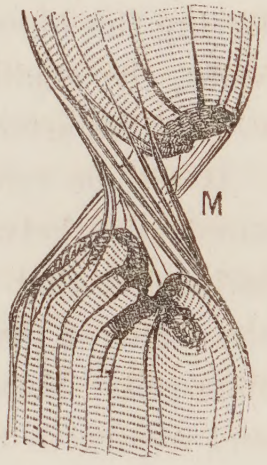


A, B, fragments of striated muscular fibers; C, D, more highly magnified fibers, detached.

Fig. 1 represents fragments of muscular fiber magnified three hundred times, showing the fibrillæ detached at the end. (B.) More highly magnified fibrillæ are seen detached at C, D. Without at all entering into histological discussions, it will be recollected that the muscular fiber, like that of all other tissues, is of cell-formation, each fibrilla being a row of cells with its enveloping myolemma, and that an accumulation of these with their investment forms the muscular fiber; an aggregation of such fibers constituting the muscle proper. It will also be recollected that the muscular fiber-cell performs every functional act, whether of contraction or nutrition.

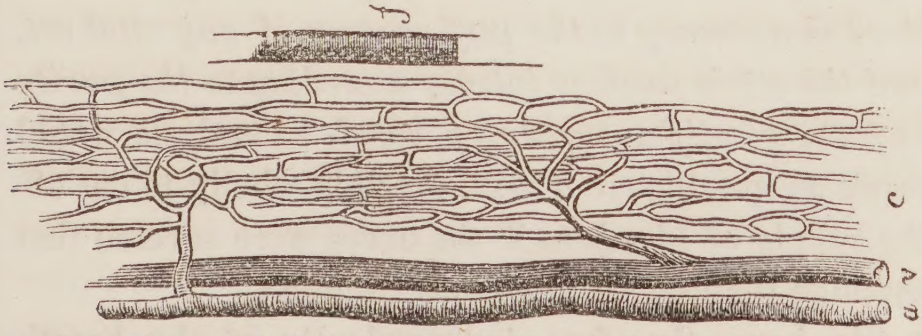
Fig. 2 represents the myolemma, the membranous envelope of the fiber-cells clinging between the fragments of a torn muscular fiber.

Fig. 2.



The myolemma of torn muscular fiber.

Fig. 3.



Capillaries of a small fasciculus of muscular fibers, from the neck of the dog. *a*, terminal twig of artery; *v*, commencing twig of vein; *c*, capillaries; *f*, single muscular fiber to show the relative size and direction of those to which the capillaries here represented are distributed.

Fig. 3 represents the capillaries of the muscular

system. The capillaries lie between the fibers, principally in the longitudinal direction, with numerous frequent communications between them, as shown in the cut. It will be noticed that their arrangement is exceedingly favorable for their contents to be affected by the pressure upon them of the contracting muscle. The lateral expansion of the fiber during contraction encroaches upon the space occupied by the capillaries, forcing the blood in these vessels forward toward the veins, the capillary valves rendering a regurgitation toward the arteries impossible.

It will be remembered that there is no direct communication between the muscular fibers and the capillaries, but that the nutritive material passes through the walls of the capillary vessel, the myolemma, and fiber-cell. Muscular contraction, causing progressive and regressive changes in the fiber-cell, is the incentive for endosmotic and exosmotic action to take place, provided there is the presence of arterial blood in the capillary net-work. *For the presence of arterial blood is necessary to the performance of any vital act, and the act is weak or intense according to the purity and the plentiful supply of blood.* Paralysis would result as speedily, if it were possible wholly to cut off the supply of blood, as if the nerve were severed that supplied the part with nervous stimulus.

We have, therefore, independently of the heart's action, a most important portion of the *circulation* under the control of the will. That the heart alone is quite insufficient to keep up the circulation is appa-

rent when any cause—fright, cold, strong emotion, the deoxygenated air of close rooms, etc.—operates to partially suspend the nutritive processes in the tissues, causing sudden recession of the blood toward the heart and other internal regions, faintings, apoplexy, etc. In such circumstances we are obliged to assume the most favorable conditions, in order that the circulation, partially unaided—for total suspension would be death—by organic changes, may be kept up.

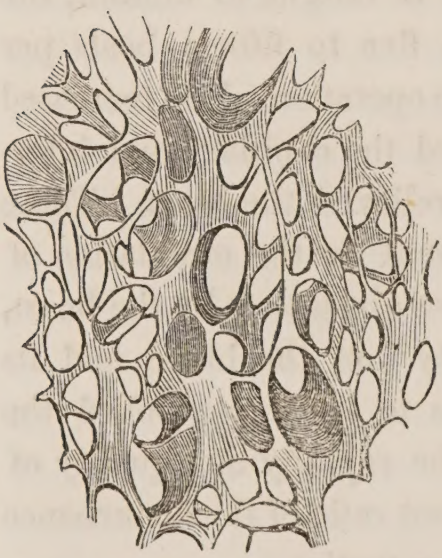
Consumption—a most wasting disease—is characterized by *rapid* pulse and *feeble* nutrition. I have often remarked, that if the muscles of a consumptive patient be put into strong contraction under circumstances where the heart's action is not increased, that is, by having the patient's muscles stretched by another without much effort or fatigue to himself, the pulse invariably *falls* from five to fifteen beats per minute immediately after the operation. The increased muscular nutrition had aided the capillary and interstitial circulation, and thus relieved the heart. Those writers who attempt to account for the circulation of the blood, besides the impulse given to it by the heart, by suggesting the "viscidity" of the blood and its "capillary attraction," seem to have overlooked the fact, that the variations in the rapidity and quality of the pulse is always in the exact ratio of the disturbance of nutrition, *i. e.*, of molecular motion.

"The desire for food or drink," says Dr. Neumann, speaking on this point, "may be increased by strong movements of the body. This could not arise except

from great and rapid changes in the formative processes in the body, which is caused by the movement of the muscles in connection with the general organic movements. Thus the fluids of the body must become rapidly diminished, because the exhalation through the lungs and skin and the external and internal capillary net-work is increased, and because at the same time a great quantity of the fluids have been changed into solids." We are, therefore, to conclude that the circulation, both within and without the vessels, is very sensibly influenced by the nutrition and its accompanying molecular movements in the substance of the tissues, and of which the muscular tissue forms the most important part.

There is another tissue, which, though generally minutely described by anatomists, is often practically overlooked by physiologists. The *areolar* tissue of modern authors is here alluded to. Fig. 4 gives a good illustration of the structure of this tissue.

FIG. 4.



Portion of areolar tissue inflated and dried, showing the general character of its larger meshes. Each lamina and filament here represented contains numerous smaller ones matted together by the mode of preparation

The areola is the true investing and connecting tissue. It isolates the various organs, dipping down between them and supporting them. It accom-

panies the veins, arteries, and even surrounds the capillaries, and often the nerves also. "Indeed, it enters to such an extent into every part and organ, that if all the other tissues were entirely removed from the body, its conformation would still be preserved in every part by the areolar tissue; and except from the removal of the osseous and muscular tissues, its weight would be but slightly diminished." "It invests the muscles and gives off prolongations investing the fasciculi of the fibers."* This tissue is capable, by its relaxation or retraction, of causing *mechanical* variations in the *capillary* circulation, and of other fluids generally, and in this way seriously interfering with nutrition; thus affording the basis of several pathological conditions, to be considered hereafter.

The areolar tissue connecting together into one mass all the parts adjacent to the muscle, by its strength and elasticity, subjects the whole to the peculiar mechanical influence, to say the least, of every contraction, extending even to quite distant parts.

The *third* point to consider, is the influence of the *nervous* system upon the nutritive processes.

Vegetative life is common to all organized beings, but in the higher orders this vegetative life has super-imposed on it the dynamic or animal life, whose medium is the nervous system. The animal life furnishes the conditions for the vegetative life to operate in. In other words, while the cell-formations take place by virtue of their own endowments, the nervous

* Peaslee.

system controls many of the conditions under which this inherent plastic power must operate. Through the influence of the nervous system, there is kept up the most complete inter-relations of part to part, organ to organ, and function to function. The sensitive, motor, and sympathetic nerves have actual fibrillated connections and a mutual dependence, so that it is impossible to influence one without influencing in some measure all the rest. The nervous system is a republic, delegating, it is true, certain duties to each member, but never giving up the dependence of each part upon the whole body politic. Every action of one part engages the attention of all the rest.

Dr. Marshall Hall's doctrine of the *reflex* action of the cerebro-spinal system explains many of the phenomena of nutrition, and by the Movement-Cure is made of practical use in medicine. The idea of reflex action, of afferent and efferent nerves, is something more than a mere abstraction, or even than a well-established but simply curious and interesting matter of physiology. It is a matter of precise gunnery—a means of hitting the mark without roundabout or doubt, and of producing in a given part or organ those conditions of nutrition required to promote a right instead of a wrong functional manifestation. What can be more plain? To act upon it we have only patiently to investigate the laws under which these manifestations of the nervous system take place.

It has been long known that the *irritation* of the sensitive loops of an afferent nerve will produce a

similar irritation (pathological) in the organ upon which the efferent nerve is distributed; such, for instance, as the production of vomiting by tickling the throat, uterine contractions by irritating the breasts, etc. But while physicians have followed the *pathological* manifestations of the law by the use of the whole batch of counter-irritants, both internal and external, they have entirely ignored its *physiological* manifestation. It surely is a perfectly philosophical practice, and one entirely consistent with the well-established doctrine of physiology here alluded to, to cause a *healthy* instead of a diseased condition in the region of the afferent nerves, if we would produce a healthy manifestation in the organ to which the efferent nerves are distributed.

Thus we see that in a particular muscular effort made to correct a certain abnormal condition, we must in selecting it not only recognize the nutrition (general, so far as the plastic material is concerned; local, that the right action be produced specifically at the right point; and of the blood, that it shall flow in accordance with the indication, as increasingly toward the extremities to relieve a congestion), but the particular condition of the nervous system must also be taken into the account. It may not be muscular action simply that we want; but muscular action *modified* as indicated by the state of the nervous system.

For instance, in case of wasting disease—as consumption—increased muscular nutrition and increased peripheric circulation are desirable, nothing more so;

but with the nervous depression incident to the disease, muscular action, if not made under such circumstances as will *diminish*, rather than increase this nervous depression, will not promote either better circulation or better muscular nutrition, and may diminish both. Only when muscular action is had corresponding with the state of the nervous system, that is, not increasing exhaustion or irritation, will the nutritive processes be favorably affected.

The special influence of the mind and will upon the general bodily nutrition is daily manifested and acknowledged by every physician. "The patient must keep up his hope," says the doctor; "he must have confidence in me, or my efforts will be unavailing," says another, and so on. Hope to the sick man brings life and health; despair to the well man brings disease and death. Each mental manifestation has not only its natural language of position and motions peculiar to itself and different from all others (thus affecting of course the nutrition of the muscular tissue employed in maintaining that position), but there is always more or less disturbance of other functions with their corresponding change of organic processes. When luscious fruits are presented to the eye, we not only reach forth the hand to receive them, but the "mouth waters"—the salivary glands pour out their secretion. Bad news impairs the appetite and the secretion of gastric juice; while good news increases both. Melancholy destroys the action of the bowels, causing constipation; while sudden apprehension often

produces a cathartic effect.* Fear acts upon the skin, causing a "cold sweat" to bedew its surface. Sympathy, contrition, grief, produce tears, and so on.

Now, all this indicates that there may be a *Medical Psychology;* that, as both general and local variations of the formative processes take place in accordance with mental manifestations, so these manifestations may be so *directed* as to control nutrition for special purposes. For instance, it is easy to conceive that, so far as a change of matter is concerned, a muscular contraction under the influence of *volition* would be *different* and *more* than muscular contraction produced by reflex action. If, now, a movement is made for a special purpose, with pre-determination and precision, the muscular contraction advancing slowly and uniformly, that the nutrition of the muscular tissue is affected by the contraction, every one knows; but is not the steady, unvarying direction of *volition* upon it for promoting a special functional manifestation particularly favorable to its *proper* performance?

When a patient is conscious that his efforts are for a specific purpose, the localization of the effort is peculiarly favorable to the production of the desired effect. Not only is there specific local muscular action in contradistinction from general irregular action, but the concentration of the will must produce a controlling

* The writer knows a lady who, though an excellent specimen of health, regular in all respects, yet fifteen minutes of anxiety for her husband or child produces a violent purging, six or eight times in an hour, and till the anxiety is removed.

influence on the dynamic forces of the parts. There is no doubt but that the effect of all modes of treatment is much influenced by what may be termed the "medical psychology." This view may account for the wonderful results produced, generally among ignorant and superstitious people, it is true, by various means wholly absurd and inefficient in themselves, such as the laying of hands over diseased parts, incantations, etc., but if we are to believe evidence, with all due allowance for exaggeration, producing often manifestly favorable *results.*

If it be true, as it is sometimes ably maintained,* that all the phenomena of mesmerism, and kindred manifestations of a peculiar kind, can be explained, or if any of them can be explained by the actual influence of the person's own mind over bodily functions under peculiar circumstances, we need not descend to the vague and mysterious in making available the same forces as remedial agents. For instance, it is said, and it seems probable, that the process of mesmerism, biology, etc., is simply such that it serves to *concentrate* the attention upon *one* object or class of objects till the attention becomes *wholly* absorbed in it, and *wholly* withdrawn from all other objects. Under such circumstances the mind becomes exalted and exceptional with reference to those objects within its narrow range, and wholly oblivious to every other contemplation or impression. As this explanation coincides with what happens in our everyday experience, it is no doubt the true one.

* New Englander for May, 1858.

For instance, two persons engaged in animated conversation, or persons closely occupied in thought or deep study, do not hear sounds or see sights which they would if their attention were not thus pre-occupied, though the sounds fall on the ear, and the image is formed on the retina just the same; still they are unconscious of sight or sound, simply because their attention is drawn in another direction. It often happens that persons no more absorbed than usual about their ordinary business affairs, are so oblivious to all else except what is passing at the time in their brain, that they may be subjected to actual bodily harm, can be pricked or pinched and handled in various ways, and be unconscious of it till it is carried to the extent of actual pain.

These facts are important to be understood, for they explain how patients can disturb their own functions by unwise attention to them.

Many a man has given himself the dyspepsia in consequence of reading books very good in themselves, but which turned his thoughts too constantly to his food and his stomach. It is often noticed that medical students, during their first course of lectures, experience in their own persons all the symptoms they hear described by the professors. There can be no doubt but that by trying long enough in many cases they might actually have the disease also.

But this condition also carries with it the remedy. The good influence of withdrawing the contemplation from a diseased organ or condition is equally manifest, whatever may have been the origin of the disease.

And the further good effect of making stated and vigorous efforts to accomplish certain purposes—not only those which are apparent to the eye and senses, but *any* physiological purpose—is equally manifest and as sure to follow. Common experience illustrates this. Physicians often advise—and if carried out, the advice is as often followed by the desired results—their patients troubled with constipation of the bowels to make regular stated efforts to produce alvine discharges. This habit is often efficient when the seat of the constipation is much higher up than the locality of the voluntary muscles of the rectum. As constipation results from insufficient intestinal fluids as well as insufficient propelling force, the will must have had effect in increasing the secretion of the glands of the bowels, as well as promoting vermicular motion. In both cases the *circulation* of the blood in the capillaries must primarily have been affected by the will.

In the treatment, by movements, now under consideration, where the patient is literally *handled* and made to do certain definite things as indicated by his condition, the favorable influence of the mind, and of the nervous system generally, is one very happy element of the treatment.

The law of the expenditure of nervous force seems to be that it is in the ratio of its *intensity*. In other words, fatigue seems to be caused in the ratio of the *effort* made, without reference to the amount of contractions in the muscles, at least till a certain point is reached. For instance, a certain number of steps can be taken in

walking with perfect ease, which it would be wholly impossible to take running. And so of all our voluntary movements. But *habit* may in part supersede volition—as where dexterity is acquired—in which case the movements are automatic, the spinal cord presiding over them, which causes very little nervous fatigue. Again, movements directed by another require only slight volitionary effort, and therefore produce a small expenditure of nervous force, compared with the amount of muscular contraction secured, especially if that contraction be slow, uniform, and prolonged.

If we can control the action of the nervous system, regulating the amount and direction of the expenditure of its force, separating it, to a certain extent, from the muscular, we shall have gone far toward regulating all physiological phenomena of the individual.

Thus we would have it in our power to answer the indications in many chronic derangements, and to substitute a normal for an abnormal condition, removing at the same time the cause of the disease and the disease itself—subject only to the greater or less impressibility of the system.

Some of the most important conditions of nutrition have now been barely hinted at; only enough to form the basis of a treatment pretending, in a natural, physiological way, of being capable, by regulating these nutritive processes, of substituting the harmonious play of all the forces instead of the deranged conditions called disease. To do more would be to reproduce the

whole of physiology. Modern physiological science, so generally treated of in the books, and regarded by medical men too much as simply curious and interesting subjects for the student, but having little relation to the purely experimental systems of medicine, is by the Movement-Cure made the basis of an exact science of healing.

CHAPTER II.

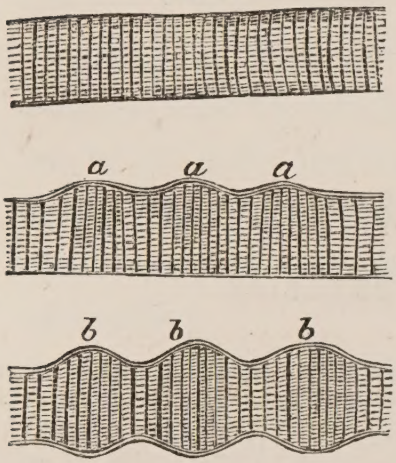
MUSCULAR CONTRACTION.

METHOD OF CONTRACTION—Caused by Oxydation of Tissues under Stimulus—Repair—Slow Movements diffuse the Contraction—Food, Drink, and Respiration vary in amount with the Use of the Muscles—Muscles are Levers to move all Vital Phenomena—PATHOLOGY is altered PHYSIOLOGY—We should modify the Latter as indicated by the Former—How to do this—Eccentric and Concentric Contractions—Effects upon the Circulation—RETRACTION and RELAXATION of Tissues—How caused—Endosmose and Exosmose—All Organs, when Abnormal, have one of these Conditions—Correspondence of Concentric and Eccentric Contraction and Relaxation and Retraction of Tissues—How to control Capillary Circulation according to these Conditions of the Tissues.

MUSCULAR contraction depends upon the primary fact that muscular fiber, under appropriate stimulus, shortens itself. This shortening of fiber under stimulus is the result of the shortening of the fiber-cells in length, and their corresponding increase in diameter. But it must not be inferred that this action takes place in the whole muscle, or even in the whole length of any one fiber, at the same moment of time. "Different portions of the length of the fiber assume this condition at different moments, and hence the whole structure is thrown into a form which recalls the motion of a worm." The different degrees of energy with which a muscle contracts do not depend so much upon the energy with which each fiber-cell contracts, as upon the *number brought into action at one time.**

* Draper's Physiology, p. 439.

FIG. 5.

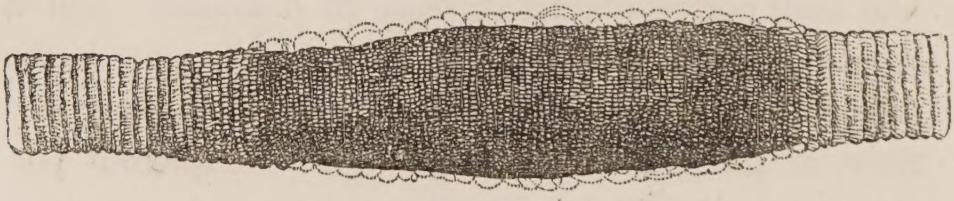


Muscular fiber previous to and in successive stages of contraction, showing that only a part of the fiber is in action at one time.

Fig. 5 represents stages of contraction seen in the skate. The uppermost figure shows the state previous to the commencement of active contraction. *a a a*, successive "waves" of contraction seen moving along one margin of the fiber, marked by a bulging of the fiber, an approximation of the transverse stripes, and a consequent darkening of the spots. *b b b*, similar "waves" still moving along the fiber, but engaging its whole thickness.*

Fig. 6 is a muscular fiber of the dytiscus, contracted at its center, with the myolemma raised on the surface.

FIG. 6.



Muscular fiber contracting; the length shortened and diameter increased; the myolemma raised in bullæ on the surface.

Dr. Draper† has very clearly shown that muscular contraction is the *result* rather than the cause of muscular waste; that the *oxydation* in the cells caused by a stimulus occasions an actual change in the structure of the fiber—the waste matters passing by exos-

* Peaslee's Human Histology. † Draper's Physiology, p. 446.

mose into the venous capillaries—and that the *contraction* is the mechanical result; supply and repair taking place immediately from the arterial blood. But it is sufficient for us to know that actual loss of tissue takes place with every muscular contraction, which is immediately supplied from the blood by the plastic power of the fiber-cells themselves. But this repair is not immediately perfected, and hence we are obliged to spend at least one third of our lives in the total unconsciousness and inactivity of sleep, that the reparative process may be completed for the activities of each succeeding day.

It is evident that to produce the greatest change in the nutrition of muscle, some *time* must be allowed for the successive "waves" of contractions to be propagated along the whole length of the fiber—as it occupies the same spot only a moment at a time—or resistance should be opposed, in order to bring a larger number of the fibers into action at the same moment to overcome such resistance; or, still better, both the slow and the resisted movement should be employed. It can readily be seen that such a contraction would affect a much greater part of the muscle; and besides, it would cause but a slight expenditure of nervous force, for we have seen that nervous exhaustion is in the ratio of the *intensity* of its action, and in such a movement it would have very little intensity.

Thus it will be seen that a large and important portion of the nutritive processes whereby our systems are built up and sustained, is under a certain amount of

control of the will. A large or small amount of food and drink is required—varying in quantity at least one half, according as we create a necessity for it by using our muscles. Even the amount of the air we breathe—the vital oxygen of which is concerned in the minutest changes of the constituents of our tissues—is greater or less, as we *will* it to be, being regulated according to the amount of those changes which our own volition has caused to take place. And not least of all vital phenomena, the manifestations of the nervous system are capable of precisely the same voluntary regulation. Indeed, *all* vital phenomena are so far under our control as to be at least, directly or indirectly, *modified* at will.

The great lever, or certainly the most convenient lever, by which to move and modify all other manifestations of force, is the muscles.

Having the handle of this great lever in our hands, it becomes a matter of intense interest how we shall move it so as to elevate depressed faculties. Can we so control the action of the muscles as to influence pathological processes? And what is pathology? "Pathology," said an eminent lecturer, "is simply modified physiology; it is only a variation one way or the other of the ordinary physiological action which we call health."

If pathology is modified physiology, and if we can *produce* a modified physiology corresponding with and opposed to the pathological state, and the result is a physiological or normal state, we must thereby cure

the disease. For instance, if a patient suffer from "rush of blood to the head," and has cold feet, if we can act on the muscles of the feet and can induce a free circulation there, we produce a derivative effect and relieve the head. What was before pathological is now physiological, and brought about by purely physiological means.

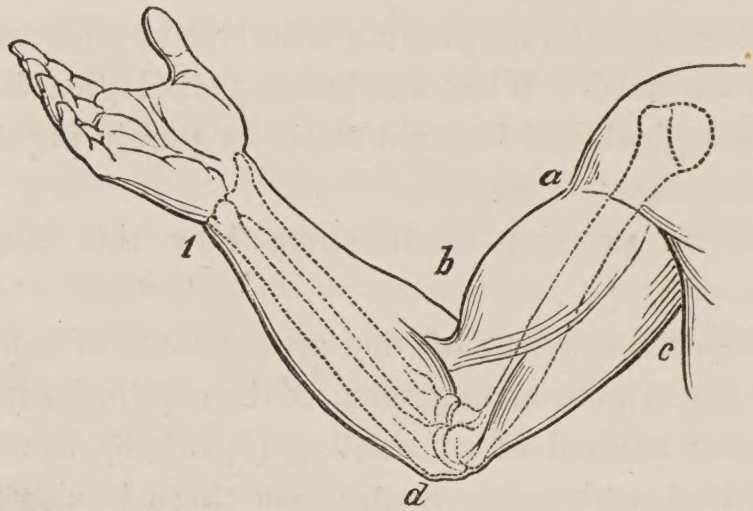
Let us proceed to illustrate how this may be done.

From the construction and arrangement of muscular fiber (fig. 1), the arrangement of the capillaries (fig. 3), and the method of contracting (figs. 5, 6), it will be seen that with every contraction there is also a *mechanical* effect within that tissue itself; the capillaries are mechanically *pressed* upon, driving the blood along into the capillaries nearest the veins, and ultimately into the veins themselves; at the same time all the fluids, from the pressure, more or less change places. This mechanical effect of propelling the venous blood forward by the pressure of muscular contraction, can be well enough seen by seizing the arm just above the elbow with one hand so as to stop the return of blood in the large veins, and suddenly contracting the muscles of the fore-arm; the superficial veins will immediately be filled.

But while this effect is taking place in the contracting muscle during a movement, its antagonist is placed in just the opposite state, *i. e.*, it is being *drawn out*, and its capillary net-work relieved from pressure.

Figs. 7 and 8, which are representations of the flexion and extension of the forearm, will convey a

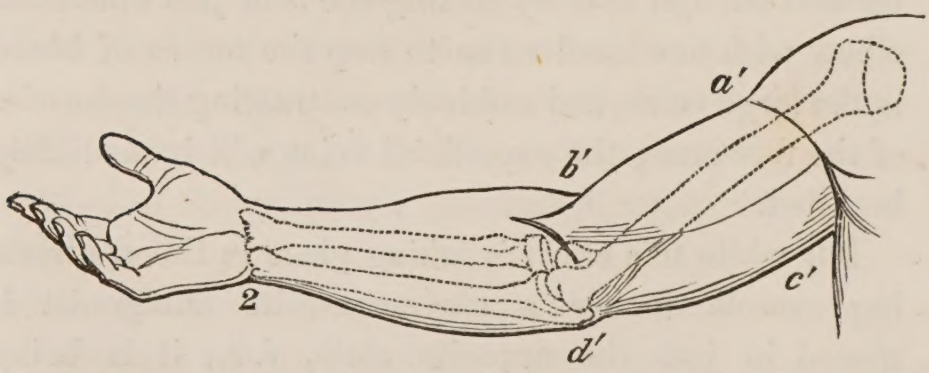
FIG. 7.



Flexion of the forearm, showing that while the contracting muscle *a b* shortens itself, its antagonist *c d* is drawn out longer, illustrating that while the pressure of contraction in *a b* forces the fluids into the venous capillaries, the relief from pressure in *c d* allows arterial blood to flow into the capillaries.

clear idea of the different relative physical states of flexors and extensors in every movement. Suppose *a b* to be the biceps flexor, and *c d* the triceps extensor of the forearm. Now, when the arm is motionless, the

FIG. 8.



Extension of the forearm, showing that *a′ b′*, previously shortened, is now filled with arterial blood by being drawn out, and its capillaries relieved from pressure, while *c′ d′*, by its contraction and consequent pressure, forces its previously accumulated blood into the venous capillaries.

relative condition of both muscles is exactly alike. But if the forearm be moved from 1 to 2, it is done by the contraction of *c′ d′;* but *a b* is by no means passive, but contracts constantly, else the movement would be made by a sudden jerk—only *c′ d′* contracts just enough more than *a b* to overcome the latter, meantime *c d* is shortened from *d* to *d′*, and *a b* is lengthened from *b* to *b′*. Therefore the contraction in *c′ d′* is called "concentric," because that muscle shortens itself, and the contraction in *a b* is properly called "eccentric," because it is drawn out longer, while still contracting itself.

Now, while the "concentric" contraction in *c′ d′* is going on, and as we have seen with the effect of driving the fluids along toward the veins—the "eccentric" contraction in *a b* (the muscle being actually *drawn out* by the superior force of the antagonist muscle, *c′ d′*) causes the capillary net-work to be *relieved* from pressure, and there is no hindrance to the influx of blood or other fluids. But blood can not *return* from the *venous* capillaries on account of the valves, and hence must flow in through the *arterial* capillaries, especially since the contraction itself creates a physiological demand for arterial blood.

In the ordinary flexions and extensions in the use of the muscles, the combined influence of the concentric and eccentric contractions is to promote the normal circulation and nutrition of the muscles employed. But suppose that in moving the arm (figs. 7 and 8) from 1 to 2, *resistance* be applied at the hand by

another force than its own antagonist muscle, then *a b* will not contract during the movement, the normal stimulus to contraction being withdrawn in consequence of an opposing force being already supplied by the resistance from without; and though drawn out, it remains relaxed and flabby during the movement, having neither the physiological nor mechanical condition for the influx of arterial blood. Hence we have *isolated* the effect of the movement upon the single extensor muscle *c' d'*. Again, suppose that *force* is applied at the hand—that is, suppose the extension of *a b* is made by another person instead of the antagonist muscles—and *a b* is this time *drawn out* by that force instead of the contraction of *c' d'*, then in that case the extensor muscle *c d* will not contract, its *force* being supplied from without, and it will possess neither the physiological nor the mechanical condition for propelling forward the *venous* circulation, but will remain entirely inactive. Hence the only result of the movement is the eccentric contraction of *a b* with its influx of arterial blood, which effect is therefore also isolated—that is, there is no corresponding effect in the other muscle. Furthermore, it is very clear that if the movement were made with *resistance* both ways, from 1 to 2 and from 2 to 1, the contraction would be first concentric in *c d*, and then also concentric in *a b*, without any eccentric contraction being employed. Or if *force* be used to move from 1 to 2, then *a b* will be eccentric, and if *force* be also used to move from 2 to 1, then *c d* will also be eccentric, and there will be

no *con*centric effect of the combined movements. Thus we have the power, if it be necessary to accomplish a useful purpose, to produce different and opposite conditions in the muscles—conditions often indicated in chronic disease. We can not only make local impressions, but we can vary the quality of those local impressions as indications may require.

But it should always be borne in mind that, to secure the best results upon local or general nutrition, the muscular effort should never be carried too far—never to approach exhaustion—for in that case a certain amount of the plastic power of the fiber-cells will be exhausted, which would destroy the effect sought to be produced. After the required impression has been produced upon a part with sufficient perseverance or intensity to incite its proper healthful functional activity, the impression should cease before there is a chance for reaction to follow, and all the progressive and regressive changes are taking, and can continue to take place in the most perfect and vigorous manner. It is not the amount, but the *quality*, of these changes that insures the most perfect nutrition.

Corresponding to the manner of muscular action just described, we find there are conditions of the tissues produced by various causes. Thus, it has been previously stated, that in health the ingress and egress of the fluids in the tissues are the same; that is, the circulation in the arterial and venous capillaries, and the passing in and passing out of the fluids through the cell-walls, the myolemma

and the areolar tissues maintain a constant equilibrium.

But when defective nutrition or disease has impaired the chemical qualities of the fluids, so that the proper alkalinity and other conditions necessary to secure the proper affinities of the nutrient and other fluids are out of proportion, or if the cell-walls, the myolemma, and other tissues from their vital or mechanical conditions, do not afford the normal conditions for proper endosmotic and exosmotic interchange of fluids, then there must necessarily arise one of two conditions, viz.: either endosmose must exceed exosmose, or the latter must exceed the former. If it be the former—that is, if more fluids pass into the cells of the tissues than pass out, then there arises a retardation or stagnation of this endosmotic and exosmotic circulation, the cell-membranes become expanded, thinner, and more feeble in their vital endowments, the myolemma, the areolar, and other tissues partake of the same characteristics, and the *venous* capillaries are less able to carry forward the general waste resulting from the progressive and regressive changes—themselves more feeble. This condition constitutes a condition of RELAXATION.

But suppose, on the other hand, that the disposition of the fluids within the cell-walls and other membranes is greater to pass *out* through the membranes than for the nutrient fluids to pass in, then, in that case, exosmose will exceed endosmose; the cell-walls and other membranes will become contracted, thicker, harder,

and present both physiological and mechanical impediments to the circulation in the *arterial* capillaries. Such a tissue presents a condition of RETRACTION.

A retracted muscle is shorter, smaller, and harder than in the healthy state, and differs entirely from the temporary *con*traction of healthy muscular fiber. In contraction the muscle swells in the middle, while the tendons at the origin and insertion lie buried deep in the parts, and relaxation after contraction speedily ensues. But in *re*traction the muscle does not swell in the middle, but seems to rise up out of the tissues, like a cord, during its whole length. This condition of retraction exists in all stages, from slightly indurated and thickened tissues to complete atrophy.

A muscle in a state of relaxation is longer, larger, softer, more feeble, and is entirely without that tonic firmness characteristic of healthy muscle when not in active contraction. This condition may also exist in all stages, from simple feebleness to actual paralysis.

Now it is believed, and in most cases it can be demonstrated, that this condition of retraction or relaxation—*i. e.*, of disproportion of endosmotic and exosmotic circulation, and consequent disproportion of the arterial or venous capillary circulation, exists in *all* tissues in all forms of chronic disease. That is to say, any variation from the proper and normal condition of the circulation and nutrition of the tissues is accompanied by either one or the other of these physical conditions. This being the case, to correct this condition of retraction or relaxation in the tissues where it

exists, would, all other things being equal, present the conditions for proper nutrition and a consequent restoration to health. It will be seen that the eccentric and concentric movements supply precisely the conditions for remedying the physiological and mechanical impediments to healthful nutrition in both the retracted and relaxed states of the tissues; the ECCENTRIC movements producing a more perfect supply of *arterial* blood and consequent effusion of organizable plasma; and the CONCENTRIC movements accelerating the egress of the fluids from the tissues to the venous capillaries and veins. This is very apparent, so far as the muscular system is concerned, which, by acting on the various levers of the body, can be put in the desired states. But the application of this principle is confined to derangements of the muscular system, or even to the general effects upon the quality of the nutrient fluids, as previously explained, but even the organs of the viscera can be acted on by mechanical means to promote their healthful nutrition in accordance with their pathological states.

All organs have their *mechanical* stimuli, and not less so because they may not be contractile tissue or muscle. For instance, a kneading of the *relaxed* abdomen would affect its contents differently from kneading the *expanded* abdomen; or a vibration of the chest and lungs in a stooping, contracted position would affect those organs opposite from a vibration of the expanded chest, with the hands stretched up over the head. In fact, the first movements mentioned in each case would be appropriate for a condition of *relax-*

ation of the parts, and the second would be useful to correct a *retracted* state.

But there is still another very important consideration to remember. In all cases of disease of internal organs there is secondarily produced a similar condition in the muscular tissues adjacent or containing those affected organs. For instance, in consumption, where there is a retracted state of the parenchyma of the lungs, there is always a shrunken condition of the chest; the muscles are thin and hard, and their appearance is so characteristic, that all physicians understand the outward appearance of the chest as indicating the condition of the organs within. So in constipation, the muscular coverings of the abdomen are hard and unyielding, and present the usual appearance of retracted tissues, which is the condition of the intestines beneath; while in chronic diarrhea, which is a relaxed condition of the abdominal organs, the muscular coverings are also relaxed and flabby.

The importance of appreciating these facts can not be over-estimated; for, by producing in the coverings the condition indicated by the pathological state of the visceral organ, aside from direct mechanical effect in the organ itself, there is also a *secondary* effect in turn on the organ beneath, in consequence of the primary condition being produced in the muscular coverings. Thus if, in constipation, movements be given which expand the abdomen—*i. e.*, eccentric movements—the contents of the abdomen must also be expanded, which would of itself promote a better

arterial circulation and consequent nutrition in them; but at the same time, while an arterial condition is also produced in the retracted abdominal muscles, the same condition would be *secondarily* produced in the abdominal contents, on the same principle that the muscles were retracted in the first place by the retracted condition of the abdominal organs.

The same idea has been carried out in a very crude way, from the earliest periods of medicine, by the use of issues, setons, plasters, blisters, etc., *over* a visceral organ—as the lungs for instance—for the purpose of producing an impression in an organ having no *direct* connection with the part irritated—that is, "counter-irritation;" but a physiological counter-irritation must be at least as philosophical as that produced by pathological means. It seems to be a law, whose constant operation is secured through the intimate connection of the blood-vessels, lymphatics, and the ever-acting circulation of fluids by endosmose, as well as through the influence of the nervous system, that a perfectly healthy organ can not exist in juxtaposition with a diseased one. And on the other hand, it is equally true, that to cause a healthy nutrition in an organ near a diseased one, is to secure a more perfect nutrition in the diseased organ itself. For instance, in caries of the spine, instead of destroying the tone of the spinal muscles by braces and pads, pressing on the point of disease, those muscles should, by every possible means, be kept in the highest vigor and most perfect health they are capable of, not only for their

aid as the natural supports of the spinal column, but as the direct means of causing a healthy, instead of the ulcerative process in the bones beneath them.

Thus it will be seen that the various movements of the body, both voluntary and involuntary, though not of service in every case of disease—perhaps in no case of *acute* disease—can be so controlled and directed as to secure very many of the conditions of proper nutrition or health; the healthful quality and purity of the blood; its proper and equal distribution; the just and unperturbed influence of the nervous system; and general and normal nutrition in all the tissues of the body. So also the special correction of particular conditions unfavorable to right nutrition in different parts, in accordance with the nature of the pathological states, whether of external or internal organs, whether of the muscular or involuntary system, can also be brought under intelligent control. All this in connection with or without any other medical means, as the indications of the case may require.

Here we have the basis for establishing a medical treatment, which, though occupying a limited field, will be purely scientific and in accordance with physiological principles. With none of the elements of empiricism it will be simply auxiliary to all legitimate methods.

In all ages and in all times the same ideas have been acted on, and the same processes undertaken, but not until the last fifty years has there been any attempt to reduce what was formerly esteemed simply hygienic to become a regular medical system.

CHAPTER III.

PHYSIOLOGY OF GENERAL EXERCISE.

MOTION affects all other Tissues as well as the Muscular—The whole Part moved must be Considered—Illustrations—Exercises should be varied for different Individuals and Classes—Relation of Exercise to the NERVOUS SYSTEM—Sensation and Volition—To Feel and to Execute—Exercise and Labor—What Kinds to be Used—For Invalids there should be a definite governing Idea—Contortions not Beneficial—FATIGUE—When Proper and when Injurious—Neglect of Physicians to Instruct Patients how to Exercise—Exhaustion, Evil Effect of—Increased by Sudden Efforts—DRESS—False Action caused by Slight Hindrance of Dress—Muscles refuse to act against an Impediment—Actual Confinement not necessary to effect Injury—LADIES' DRESS—Effect upon Chest, Abdomen, and Pelvic Organs—High Heels and Effect upon the Spinal Column—Wholesome Influence of Exercise upon the Mind.

IN order fully to comprehend the medical uses of bodily movements, it will be necessary first to consider the *physiology of exercise in general.*

It is commonly supposed that the effect of exercise is principally on the muscular tissue, but such is not the case, for movements with muscle alone would be impossible except in a few insignificant instances. Every movement requires not only the muscles engaged, but also every other part of the organ moved—vessels, tendons, ligaments, and bone. It is not the *muscle* alone, but the *limb* that moves. And if development is the result, the muscular tissue receives *only its share* of such development. It is just as necessary to the development of *bone* that it should perform *its* part in the exercise—that is, to sustain the muscles, their origins and insertions—as it is for the muscles to

perform their part in the movement of the member. It can be easily seen that the bones and all other tissues besides the muscular are necessary to the perfect action of the leg, and that the development of all these tissues is as much dependent on and affected by the exercise which all are employed in making, as any one tissue.

But this is equally true of every other part of the body; of the trunk as well as of the extremities. The muscles of the chest, for instance, can not act independently of the lungs beneath them, but taking the thorax *as a whole*, the lungs form a part of that apparatus, and the force, direction, and perfection of all motions of that part of the trunk depend directly on the condition of the thoracic contents. And every movement implicates the lungs, heart, etc., *as a part of the moving apparatus;* and the result of the movement, whether it be development or exhaustion, embraces the contents of the chest as well as the bones, ligaments, and muscles, for the reason already given, that the contents were necessary to the perfect movement.

We move in general exercise not the muscles of the body alone, but the body *as a whole*, and hence the nature of the exercise we take affects us as a unit. This is plainly seen in the physical characteristics, anatomical conformations, peculiar diseases, and even marked intellectual and moral distinctions in different classes of men, according to their trades and avocations, amusements and recreations.

It is admitted that sedentary people need systematic

exercise, but it is a great mistake to suppose that the laboring man does not also need it. He needs physical training, perhaps, to undo the injurious effects of his occupation; but of course of a different kind from the professional man. As we do not trust to the spontaneous development of the mind, but aid its growth by suitable mental gymnastics, called systematic education, neither should we allow the body to take its chance of proper or improper development. Professor Retzius, of Stockholm, Sweden, has in his ethnological cabinet many specimens that show the influence of occupation on nutrition. "A person who for a trifling and transient lameness took up the occupation of begging, used to sit at the end of a bridge receiving alms during the rest of his life. The favored limb, though long since perfectly recovered from its lameness, was used as little as possible to keep up the semblance of lameness. The thigh-bone of this limb is nearly three quarters of an inch less in circumference than the other, and more than one inch shorter. A criminal who was confined by a chain attached to one ankle for five years, died by frost in making his escape; although the bone of the unused limb had not materially changed its size, it feels as light as pine wood. An old lady sat knitting in the alms-house the last years of her life; the ribs were so pressed together that the transverse diameter of the chest was only five inches, and the pelvic bones were inclined backward in a direction opposite the healthy position, so that it was only nine inches from the top of the sternum to the pelvis. The

chest of one who has died of consumption generally measures three or four inches over the ribs less than that of a person who has died of any other disease. The vertebræ of a carpenter or of any one who has followed any similar occupation, are shown here by numerous examples to be not only larger but heavier in proportion to size than those of a tailor or shoemaker."*

Now the faulty nutrition induced by occupations, or by any course of life approaching the civilized, should be counteracted by art, so that a harmonious development may be possible for all, in *spite* of evil tendencies. The too laborious farmer or mechanic should be softened down, by appropriate physical culture suited to his requirements, which would be those that give flexibility, activity, and impressibility, rather than those which would still further increase and harden the muscles; while the too sedentary people of the towns should be hardened up to the proper standard by such a course of exercise as would principally develop muscle. The only use of systematic exercise is not, as is generally supposed, simply to increase the quantity of muscle—for excessive exercise may decrease it—but different kinds and qualities of exercise are capable of making very different and distinct impressions upon the system, according to their nature, as we see every day in over-worked men and animals.

With regard to the hygienic effect of different exercises, the following extract of a letter from a very intel-

* Dr. Geo. H. Taylor.

ligent gentleman so aptly illustrates the main ideas of the text that it is introduced here:

"I have recently received from my friend and relative —— ——, two pamphlets written by you, on the subject of the 'Movement-Cure,' which I have read with much interest. They have brought to my mind some facts in my own experience, which occurred more than thirty years ago. In my early boyhood, I lived some years at Long Branch, in New Jersey, and, while there, had several severe attacks of fever and ague. In my fourteenth year I went to New England for an education, and, soon after I was of age, I settled in one of the eastern towns of Connecticut, in the practice of law. While there, and about seventeen years after I had left New Jersey, I was attacked with severe pain in the side, and, on stating the symptoms to my physician, he told me they were caused by a diseased condition of the spleen, arising from badly-treated attacks of fever and ague; and in a few weeks, under his care, I was entirely relieved. Some years after, however, the pains returned, accompanied with cough and other pulmonary symptoms; and fearing I was threatened with consumption, to which my mother's family were subject, I removed to Baltimore and went into the drug business there with my father. I took charge of the books, correspondence, etc.; but soon found all my unfavorable symptoms aggravated by this employment, and I quitted the desk and took charge of the retail department, and was soon relieved. I went to the desk again, and my old pains and cough returned; but a few days at the retail shelves relieved me. I began to inquire why such different effects resulted from these two employments. I always *stood* very erect at the desk, never allowed myself to lean against it, or to bend or contract my chest, and I wrote there with so much ease, that the labor was not at all severe. Our principal retail shelf was high, and the bottles on it large (half-gallons), so that I had to stretch up to my full height, and use both hands, to take down the bottles; our retail business was good, and the employment quite laborious. After considering the subject for some time, I concluded it was the *peculiar kind* of of exercise (or movement, if you please) that benefited me, and I set about trying to get it in some other way. I stretched a rope across a large back room, near the ceiling, passed a ring over it, so that it would slide easily on the rope, and attached a cord to the ring, and let it hang down so that I could just reach it with *both* hands. To the lower end of this cord I fastened a stick about three feet long, and when I felt any unpleasant effects from too long confinement at the desk (where my services were very much needed), I went to my swing, took an end of the stick in each hand, and ran backward and forward, and

danced, jumped, and exercised as much as I thought necessary, and always found relief from it, and was finally entirely cured of the disordered condition of the spleen, and have never suffered from it since. My cough, however, continued, and after two years in Baltimore, I went, by the advice of my physicians, Professors Potter and Hall, to Florida, where I lived six years. I was there in the very seat of empire of fever and ague and other kindred diseases, and disordered spleens were the rule, and not the exception. I recommended my swing, and in hundreds of cases in which it was tried, it never failed. Your pamphlets, it appears to me, afford a solution of the principle involved, and I thought, perhaps, you would regard the facts as affording some support to your certainly very plausible theory, and therefore I communicate them. Numerous other facts have, doubtless, been observed by others, showing the effects of *particular forms* of exercise or movement on disease, which, from not knowing on what principle they could be explained, have been regarded as accidental, and not worth the trouble of examination. It is so in all matters of investigation, and, doubtless, so in this."

It will be seen by the above interesting narrative that the gentleman employed, in a crude way, the very means that answered the indications.* At first, the reaching up, while holding heavy bottles—which, from the nature of their contents, must be carried slowly—no doubt often rising on the toes to increase the height, and afterward the hanging by the hands, while exercising the legs, were very effectual means, and, for not too feeble cases, very proper means of promoting a peripheric circulation, and consequently relieving the congestion of the spleen, etc. At the same time, the raising and falling of the chest and diaphragm, alternately compressing and relieving the visceral organs, produced an excellent kneading effect, and supplied a local means of disgorging venous stagnations. It is hardly necessary to remark that almost any other labor

* See Chapter VI.

or exercise that he could have taken would not have had the same result, which seems to have been the case in this instance. This corresponds to the well-known practice in Ireland of hanging by the hands, from the limb of a tree, to cure complaints of the liver.

In contrast with the above account of the excellent effects of *proper* movements, the following case will show the harmful effects of *improper* ones:

A lady received advice for dyspepsia. She was directed how to take a certain number of movements in a particular order and manner. In a few days she came back very much worse. On inquiry, it was found that she had taken only those most conveniently performed, which happened to be the trunk *bendings* and *twistings;* which, without being administered *with a proper number of peripheric movements*, produced actual gastric congestion. Her form of dyspepsia was what is called chronic gastritis, and hence she was made worse in every respect. Her fault was explained to her when, by pursuing the proper course, she was soon relieved of all unpleasant symptoms.

The object of this work is not to discuss general exercise in its merely hygienic relations—that would be a fertile field, yet distinct from the present inquiry—but to investigate the strictly medical uses of active, passive, and other *localized* movements. But it may be remarked, in passing, that a great deal of harm is often done, and generally much less good is effected than might otherwise be, by the want of particular

directions and explanations, according to a patient's temperament, age, sex, disease, and other requirements in giving the common advice to "take exercise."

What is it to take exercise? It is evident that an invalid should have as definite directions, founded upon as clearly understood principles, and which should appear as reasonable to his judgment as his directions governing his diet, clothing, avocation, medicines, etc. Physicians have paid too little attention to this subject.

Exercise, as previously shown, has an intimate connection with the general nutrition, but it has an equally profound influence upon, and can and does control the manifestation of the nervous system also. The amount of nervous force (so called) possessed by any individual may be considered as the measure of that individual's capacity. This capacity may be divided into the two great manifestations of sensation and volition, *i. e.*, what we *experience* and what we *do*. In perfect health, where every functional manifestation is reciprocally well balanced, the sensations, or the capacity *to receive* impressions, and the volitionary force, or the capacity *to make* impressions, are equal. But each of these manifestations of the functions of the nervous system is capable of cultivation. Indeed, this cultivation is the essence of civilization, and to be perfect, needs only to be harmonious.

The reciprocal relations of sensation and volition may be illustrated by comparing the nervous force, or individual capacity, to a river of definite size, but separated into two streams of equal dimensions by an

island at its mouth. Now, if by any means the channel on one side of the island becomes widened and deepened, of course more water will run through it, and therefore *less* water will be left to flow through the other channel. Now, if one channel is called sensation, and the other volition, the illustration is perfect. Excessive sensational capacity precludes excessive volition or force, and so, on the other hand, great muscular force is not joined to great sensitiveness to outward impressions. By great and small I refer to the standard of the individual, for what might be much for one, might be little for another. Now, as we would lessen the larger stream by increasing the smaller one, in the illustration, so we may lessen the capacity for sensations by cultivating volition; or to speak to the practical point, our ability to be affected by impressions from without is, within certain limits, in the inverse ratio of the cultivation of our muscles.

Your fine lady, reared on sweetmeats, educated at a boarding-school with all the "accomplishments," every sense gratified, arrives at a point where a breath of wind gives her a cold; she feels the changes in the weather like a barometer, and is really capable of making only the slightest exertion, even to help herself to the ordinary necessities of life, without inconvenient physiological disturbances, and perhaps pathological consequences. A slight injury or transient illness prostrates her, not with imagined, but with actual suffering; while Bridget in the kitchen, who has been accustomed to *execute* rather than to *feel*, breaks her

arm and walks about without inconvenience until it is healed.

Any one who has frequented the hospitals, or even the college "clinics," must have been struck by witnessing how much greater an amount of disease those patients will carry about with them, and with less disturbance of the system (not of the mind) from it, than is the case in private practice among the more cultivated classes. This has nothing to do with *fortitude*, which is a mental quality, and mostly belongs to the higher classes.

Extremes are always pernicious. The savage, with a complete animal nature, lacks the cultivated intellect and perceptions to direct his brute force into useful channels, and civilization loses much of its nobleness by pandering to appetites and sensations, while the noblest resolves fall to the ground because there is no power to execute!

It is easy to see the practical bearing of the foregoing. Properly adapted exercises will not only correct the vicious tendency of certain occupations by their counteracting influence—elevating the lower classes of society by increasing their means of enjoyment, and making them more impressible—but will diminish suffering and give executive ability, character, and force to the more refined. The exercises for the first class, to give flexibility to muscle, to increase the higher sensations, should be light and active, such as games, sports, dances, and those generally requiring more agility than force; while those exercises for developing volition and power, and diminishing mor-

bid excitability of the nervous system, should be slow, uniform, easily executed, non-exhausting movements, and those requiring a certain *continuance* of action; in a word, such as will act on the muscles by their continuance and force, rather than on the nervous centers by their intensity. And as we have seen that the effect of every movement upon (*i. e.*, changes produced in) the tissues is in the ratio of its continuance, and that the effect upon the nervous centers is in the ratio of the intensity of the effort made to accomplish the movement, we have then an unerring guide in this respect as to the *character* of the exercises that it is proper for different classes of people or for invalids to take.

As the necessities of labor are compulsory (fortunately), there is no escape from the conditions attending it; we can only enjoy the good, and remedy, so far as possible, the evils attending what is unavoidable; but in *voluntary* exercise for hygienic purposes we should always have a definite object in view, of which the various bodily movements are only the means to accomplish an end. Unfortunately, gymnastics have been too much considered as certain contortions *to be done*, instead of certain physiological impressions to be made, corresponding, more or less, to the needs of the system at the time, for the securing of which this or that particular exercise is best adapted. It is often remarked, for instance, that to strike the back of the hands together behind the back at the height of the shoulders, is a feat worth striving for; whereas the *development* resulting from such

a movement would be much less than if the arms were carried only just back of a line parallel with the shoulders. Indeed, if a person be so loose-jointed as to be thus capable of contorting himself, that would be sufficient reason why he ought not to do it, till he has developed himself by proper exercises up to the point where his muscles, tendons, and ligaments hold his joints so firmly together, that such a contortion would be impossible. But the details of gymnastics are foreign to the object of this work; only those physiological principles relating to exercise in general will be considered here.

But when exercise in any form is taken to secure tissue transformation and growth, there are two considerations that should never be lost sight of. While in perfect health, it undoubtedly happens that the greatest amount of tissue-metamorphosis occurs at the moment when the nervous centers give warning, by weariness, that a similar condition has taken place in them also; yet in civic life it much more frequently happens that the best results of the exercise have been secured long before there is any sense of weariness, in which case exercise beyond that point would destroy, more or less, the good already accomplished. Or, on the other hand, and as always happens in feeble persons, there is weariness so soon that there has been comparatively little change wrought in the tissues. In the first case, as with literary people, school-girls, or where there have been previously large draughts made upon the nervous system, the exercises should never be

pushed too far; while, in the second case, the exercises should be of such a nature as to call out but very little nervous force, thus making the greatest impression upon the tissues with the least waste of innervation. It is equally true that there are cases where the principal object of the exercise is to produce fatigue. In people who are perfectly well, but from the nature of their employments there is no chance to "work off" the constantly generated nervous force, and where there is already sufficient development of muscle, any kind of exercise where considerable force is expended would be appropriate. But it unfortunately happens that, in our present state of society, such cases seldom fall under the eye of the physician. It is generally only after years of neglect of bodily exercise, coupled with constant and exhausting drains upon the nervous system—when the health is completely broken down—that the physician's aid is invoked. In such cases, the greatest care should be used in recommending only such kinds of voluntary exercise as the patient can take without fatigue, especially at the commencement of an increase of active exercise. (See chapter on Nervous Diseases.)

It is quite erroneous—but an error often entertained by lay people—to suppose that the amount of good one may receive from an exercise is in the ratio of the fatigue produced by it. As a general thing, people in ill health ought not to be required to exercise to weariness, because sickness implies, generally, a certain depression of the nervous system, which should not be

increased; but, if it is necessary to make still deeper impression upon the muscular system, then the *medical* uses of bodily movements—that is, the "Movement-Cure"—will be found necessary. Free exercise would not then be sufficient, but the patient would require appropriate, regulated, or *localized* exercise or movements, such as would answer the indications.

But it may happen, in some instances, that it is the functions of the nervous system mainly that need to be called out and exercised as the principal means of affecting the organism. When this is done in such a manner as to develop that function, by acting through it, so as to produce harmony between it and other manifestations, nothing could be more proper. When the will-power is feeble *from non-use* merely, whether or not accompanied with certain phases of hypochondria, then to produce fatigue will be a strengthening instead of exhaustive process, independent of the general physiological effect of the exercise upon the muscular system. But nothing is more promotive of mischief than the general indiscriminate recommendation of physicians to their patients to "take exercise," without any instruction as to kind, quality, or manner of taking it. Even the free exercises of invalids should always be in accordance with the *indications.*

In connection with what has before been said, it should be remarked that while *habit*—implying the presidence of the spinal cord over the continuance of what volition has set in motion—allows a much greater amount of muscular force to be employed without

fatigue than could otherwise be endured, it also should be recollected that all sudden, indefinite, unexpected movements require a vast expenditure of nervous force. A short succession of sudden trips, mis-steps, or blunders will speedily exhaust even the strongest man. And there is no doubt but that the present style of long skirts for ladies' dresses, requiring, as it does, constant, uncertain, often unsuccessful efforts to snatch the skirt away from the advancing feet, to keep them from tripping; the getting into stages and ascending stairs in crouching, unsteady attitudes, holding up the dress meantime, and all similar spasmodic efforts, require such a fearful expenditure of nervous energy, that it is, of itself, sufficient in many cases to bring on a train of the most distressing symptoms.

Indeed, the whole subject of dress, in all its influence upon bodily movements, requires consideration. Any style of dress is faulty that confines or impedes ever so slightly the simplest movement. It is not enough that the movement *may be made* with comparative ease and in the most perfect manner, but it ought to be perfectly free, else there will be next time an instinctive reluctance on the part of the muscles to perform it, or a shrinking from it, involving other parts not necessary to the original motion, with a corresponding profitless waste of power.

But still worse; by persistence, this false action—this escaping from a hindrance, instinctive at first—becomes a permanent habit. For instance, the slight impediment to the movements of the arms, especially

the upward movement, occasioned by some styles of ladies' dresses, is injurious, not so much from the actual resistance of the dress to the action of the deltoid and other elevator muscles, but because the resistance, though trifling, being persistent, causes an equally persistent shrinking away from the point of expected resistance. This style of dress—especially for females, they having fewer counteracting influences—constantly tends to produce narrow and shrunken chests, depression of the diaphragm, falling of the bowels, and injury to the pelvic organs, besides general debility from imperfect respiration.

The pernicious effects of tight lacing need not be argued here. But what *is* tight lacing? for no lady admits that she laces tightly, and many honestly deny it who still are daily suffering from its evil influences. When viewed in the light of the foregoing remarks on impeded motion, and the tendency of parts to recede from persistent resistance, it follows that a very slight resistance to the action of the respiratory muscles—a resistance falling far short of actual compression of the chest—must be extremely harmful—harmful to a degree not often contemplated even by the medical man. The fastening of tight cords or bands about the waist to sustain gentlemen's "pants" or ladies' skirts is injurious from two causes, viz.: the soft parts of the loins and abdomen are easily compressed, forcing downward the contents of the abdomen, impinging upon and displacing the organs beneath, and interfering with their functions as well as with muscular motions.

The diaphragm is dragged downward by the superincumbent weight, followed by the lungs, and the abdominal contents are forced down into the pelvis. This is more especially true in females, because of their larger abdomen and pelvis, and less power of resistance in the muscles and other tissues, and fewer opportunities to counteract by exercise the weakening effects of such malpositions of organs.

The fashion of wearing very long, especially pointed waists, that obtained a few years ago, and is liable at any time to be re-introduced, is no doubt the cause of much of the present female suffering. The abdominal organs, by such a dress, are forced low down, and fixed there so permanently, that it has been often remarked by ladies that they "could make themselves long-waisted" by persevering in that style of dress. Long stays, though more perfectly fitting the form, passing far down, as they do, over the abdomen, must press upon it with great force from their stiffness, in all forward flexions of the trunk, which, together with having the objections of long waists, more than counteracts all the fancied relief said to be afforded by sustaining the skirts.* But there is another still more serious objection to stays. The *support* they give to the upper part of the trunk weakens the muscles which alone are competent to hold the form properly erect. Even if the muscles can not sustain the trunk without too much fatigue, there can not be anything gained by holding

* Skirts should be held up either by the shoulders, or by a broad band passing *around* the hips and *below* the abdomen.

them up ever so slightly by support. Fatigue indicates *rest*, and not *assistance*. It would be better for the patient to lie down part of the time, with the advantage to the muscles of alternate action and rest, than to receive constant support, which they so soon learn to rely upon.

With reference to the clothing worn on the lower extremities, it may be mentioned that coldness of the feet is sometimes caused by wearing too tight fastenings to the stockings, thus impeding the capillary circulation in the legs, and the return of blood to the heart.* Internal congestions may thus become more liable. The shape of the shoes is of great importance. Man has a much narrower base of sustentation than most other animals, which renders it important that that base should not be lessened by cramping the feet in narrow shoes, rendering progression difficult, awkward, and quickly fatiguing. But probably the most serious fault in the feet coverings is the elevated heel often given to them. By elevating the heel, besides the still narrower base given, whether in progression or standing, the anatomical relations of the whole body as an instrument of locomotion are materially changed. As in lateral curvature of the spine, a deviation from the proper position at one point may cause several other compensating curves at other points, so an im-

* The best means of holding up the stocking, besides tapes from the hips, is the old-fashioned woolen knit garter, its fibrous nature allowing it to be lightly put around the leg, while the common elastics must be so tight as constantly to compress the leg, or they will not stay up.

proper position of one part of the locomotive apparatus will cause a succession of other false positions of other parts. By elevating the heel, and constantly keeping the flexors of the feet on the stretch, relief to them is instinctively sought by a slight flexion at the knee; this would destroy the perpendicularity of the figure, were not another slight flexion made at the hips; but as this would throw the trunk forward, still another flexion backward is required, and then forward, etc. But in the spinal column a compromise is effected by a forward curve and inclination of the head. Thus, high heels tend to produce and permanently establish a succession of zig-zags from the ankles upward, *with the weight of the body supported by the tension of the muscles*, and not, as in erect stature, by the bony frame-work. The injurious results of persistence in such positions fall not so much on the legs as on the trunk and its contents. The head inclines forward, the chest sinks, the spine curves forward, the abdominal coverings are relaxed, and the belly pendulous, with its contents pressing down into the pelvis. From their characteristic anatomy, smaller feet, broader pelvis, larger abdomen, and weaker muscles, it must be evident that women must suffer much more from this cause than the other sex. It will be seen that, as regards the relations of dress to human anatomy and movements, the faults above pointed out all center in the female about the pelvis, and becoming cumulative, even without apparent wrong-doing on the part of the subject, may be amply sufficient, in

connection with other causes, to account for the large proportion of uterine derangements among our countrywomen. It may also shed some light upon the ill success that has hitherto attended the medical treatment of those diseases, and point a way to better success in future.

It has been previously mentioned that the mind exerts a powerful and often a controlling influence upon corporeal nutrition; it is equally true—such are the inter-relations of mind and matter—that bodily conditions influence mental manifestations, and the relation of corporeal exercise and mental manifestations has probably a more intimate connection than any other vital phenomena. *The performance of function*, whether of mind or muscle, is necessary to health, and these functional activities can not be separated one from another without detriment. Aside from the general hygienic influence of muscular activity, and the consequent purity of blood, the elimination of carbonic acid, and the introduction of an increased amount of oxygen, so enlivening to the brain and nervous system, there is a positive and immediate correspondence between muscular and mental activity. Harmony is the great law of nature. With the body trained to vigorous health —not the stupid blunting of the sensations by muscular overwork—the health and proper activity of every function of the mind *must* be wide awake to the perception of moral or of scientific truths. But beware of systems of ethics emanating from a connection with paralytic muscles, or theological dogmas receiving their inspiration

from bad digestion. This is a *practical* question, and will ere long become an *agitated* question in its application to the rising generation. There can be no just education which ignores physical training. Education does not consist in efforts of the memory alone, but in the developed power to properly *use* facts and principles, as we would use our muscles. Exercise and ratiocination are almost convertible terms. The *pleasure* of exercise, that peculiar feeling of physical enjoyment which the normal manifestation of any function always imparts, is enhanced as the clear and coursing thoughts occupy one's mind after such exercises as are adapted to one's wants.

Second Part.

THERAPEUTICAL.

CHAPTER IV.

LATERAL CURVATURE OF THE SPINE.

INTRODUCTORY REMARKS—LATERAL CURVATURE—Caused by Unequal Action of the Muscles—How Effected—The different kinds of Unequal Action and Resulting Curvatures—Why more often to the Right—Sigmoid Curvature—Crescentic Curvature—Curvatures generally caused by Muscular Weakness—Weak Ankles and improper Positions—Over-Action of certain Muscles—TREATMENT of Lateral Curvature—Should Reverse the Process which produced it—Retraction and Relaxation on opposite sides of Spine—Concentric Movements for Expanded Side and Eccentric for Contracted Side—LOCALIZED to act differently on different Muscles—Illustrations—A Complex Movement—Deformity of Chest—How produced—The Ribs—The last to yield—How Remedied—Admeasurements—Concluding Remarks.

HAVING in the FIRST PART of this work taken a brief survey of the physiological relations of bodily movements to the most important functional manifestations which come directly or indirectly under our control, or are capable of being modified as indications may require, it becomes necessary in this, the SECOND PART, to show by what means this modification is to be effected.

In order to reduce this exposition to the smallest possible compass consistent with giving a clear and full view of the subject, several affections have been chosen as being well adapted to illustrate the practical

application of the general principles previously set forth.

The Movement Cure treatment is simply certain physiological principles put to practice. That, by a right employment of the muscles, we can produce *mechanical* results and alter the form of the body can be illustrated in the treatment of spinal curvatures and other deformities; that we can produce, by a modification of the same means, a special impression on the nervous system, can be seen in treatment of paralysis; and that the general physiological processes can be wholesomely affected, will be shown in the treatment of indigestion, consumption, and various other chronic affections.

First, and simplest of all to understand, is

LATERAL CURVATURE OF THE SPINE.

The pathology of uncomplicated lateral curvature of the spine is exceedingly simple. It is invariably produced, in the first instance, by *unequal action* of the muscles; generally, but not always, accompanied by muscular weakness.

The spinal column consists of twenty-four vertebræ, —little blocks of bone piled one on top of the other, with the intervertebral cartilage as elastic cushions between each, and all held strongly, but not immovably, together by the various ligaments; the whole forming a very flexible column, with little power to sustain itself in the upright or any other position in

which it may be placed, without the aid of the muscles. The spinal column is necessarily so formed in order to allow flexion in every direction, to accommodate the various motions of the body, and to secure pliability and elasticity in connection with firmness and strength—qualities, in this particular instance, necessary to co-exist in the same organ: the latter to enable it to sustain the burdens imposed upon it, and the former to secure immunity from shocks and the operation of counter forces.

The muscles of the trunk, secured to the pelvis below as a base, are attached all along the spine as "guy-ropes;" and, in several layers and groups, by their uniform, co-ordinated action, sustain the spine in place, or move it about in any required direction in the most symmetrical and perfect manner. Excepting the slight curvature, forward in the lumbar, and backward in the dorsal regions, the position of the spine and shape of the spinal column at any moment, in health, depend on the muscles.

When the muscles act in harmony—the different groups being properly set-off by their respective antagonists—then the spinal column, whether at rest or in motion, is always where it should be. But if the action of certain muscles is not properly antagonized—for some muscles do not act with the same degree of force as their mates—then this harmony and co-ordination are lost, and the spine makes a greater flexion toward the point where is the stronger muscular action, if this action is in the transverse direction, as of

the scapular muscles acting at the *middle* of the flexible column; but *from* the stronger muscular force, when acting from one side at the *ends* of the flexible column longitudinally. That is, the *spinal* muscles act like a string to a bow, and if they contract more on one side, the ends of the spine are made to approximate toward that side, making the spine to swell out toward the other side; but the scapular muscles acting at the middle would draw the spine toward themselves, and thus this unequal muscular action may cause the spine to deviate to the right or left, to or from the stronger muscles, according as they may happen to be, those that act longitudinally or transversely.

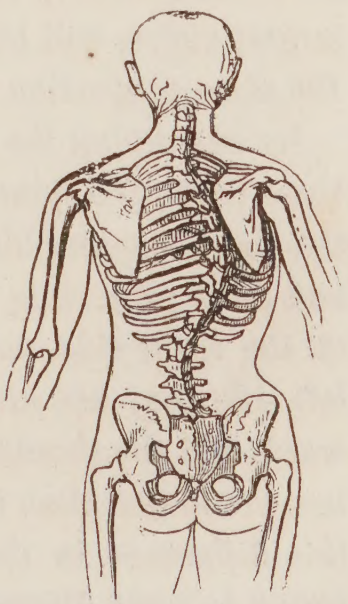
We have thus a deviation from the normal direction of the column; or, what is called a *curvature* of the spine. This deviation from the proper direction may occur anywhere in its length, but is most liable to occur at the upper extremity; which liability rapidly decreases from above downward. A forward inclination of the neck, in consequence of the greater weakness of the dorsal and cervical muscles—often brought about by the excessive strain to which these muscles are subjected by bad positions in study and various avocations—is the most common deformity to be met with. This makes one stoop-necked, round-shouldered, etc. But this condition, though a real deformity, and a great detriment to personal appearance, yet is so common, and causes so little physical inconvenience, that it is generally overlooked or ignored, or is erroneously considered a natural defect. The latter opinion is a

mistake. It is really a deformity, produced in the manner above mentioned, and might be the subject of medical treatment.

The next most frequent curvature of the spine is in the dorsal region, and is caused by the unequal action of antagonistic muscles at *each side* of the spine; the deviation and bending being toward one side—most frequently, by far, to the right. This deformity—viz., lateral curvature to the right—is the one now under consideration.

Why it is that, in lateral curvature, the deviation is more frequently to the right (it has been stated to happen three times in every four), is probably partly explained by the fact that the right arm is used the most, and is consequently stronger than the left, especially about the scapular muscular attachments. Printers who have worked for a long time at the hand-press, frequently have the spine pulled to the right by the powerful muscles about the right shoulder made by the constant use of that arm. It has also been suggested that the right lung, being the larger, may have some predisposing influence; but faulty positions in sitting, standing, and at the writing or study desk, increase this ten-

FIG. 9



Sigmoid curvature of the spine to the right.

dency to a great degree. However, the treatment for the one, reversed, would be the treatment for the other, and the reader will bear in mind that I speak of the curvature to the *right*.

Fig. 9 is an excellent illustration of the most common form of lateral curvature. It presents, as will be seen, a double or *sigmoid* incurvation, with the principal and primary curve in the middle of the dorsal region, to the right, and a smaller secondary curve in the lumbar region, to the left. There is also another secondary curve in the cervical region. These latter curves are in consequence of, and for the most part are dependent on the principal primary curve in the middle of the back. Here is where the evil generally first commences, and to this part must our treatment, to be successful, be principally directed; because the curves above and below, being dependent on this first and largest curve, will be restored at the same time and in the same proportion with it.

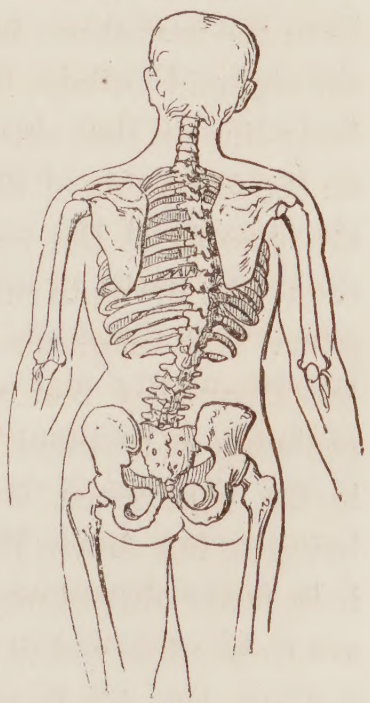
By examining the cut, which very truly represents these cases, the spine is seen crowding up and under the right shoulder-blade, making that shoulder higher and more projecting than natural; and the ribs behind, on the right side, make a shorter bend, while on the left side they are much straightened and turn downward, and the shoulder-blade of that side is lower and less prominent than natural. Many people think that this difference in the appearance of the shoulders is owing to some disparity in the shoulders themselves; but this is never the case. The shoulders are really

alike, and any difference in *appearance* is always owing to a deviation of the spine in that region toward one side, and medical aid should immediately be sought before the curvature becomes fixed and irreparable.

Again, many suppose that one hip—generally the right—is larger or higher than the other, when this difference is only apparent; the incurvation of the dorsal spine toward the left side draws in the body-line on the right side (fig. 9), leaving the right hip prominent, and making an acute angle and deep indentation over the hip on that side; while on the left side, the line is straightened, and the natural angle of the body-line nearly or quite obliterated. This obscures the left hip, making it less prominent, as it is partly hid in the tissues. Although habitual standing on one foot, as will be presently shown, favors the formation of a curvature, still it is difficult to see how one hip can really be higher than the other while standing on both feet, unless there be a difference in the length of the legs.

There is another species of lateral curvature, differing somewhat from that just described and is seen represented in fig. 10.

FIG. 10.



Crescentic curvature of the spine to the right.

This, for the sake of distinction, may be called the

crescentic form. In this form the spine takes a single sweep in one direction, without the *compensating* curves toward the opposite side, above and below, as in the previous instance. The only reason that I can assign for this is the fact, that, in the crescentic curvature, the point of greatest deviation is much *below* what it is in the common sigmoid variety; and, probably, there is too little room for a compensating curvature in an opposite direction in the lumbar region, and no necessity for it above. This seems to be a sufficient explanation. The appearance of the shoulders in the latter case is not so much altered as in the first or sigmoid variety—not generally so much as shown in the cut; but the hip is prominent on the *opposite* side from the curvature, instead of on the same side, as in the sigmoid variety, in consequence of the angle of the body-line on that side being increased, and diminished on the same side of the curvature. In this respect it is the *opposite* of the common sigmoid curvature. This should be borne in mind, or else it may lead to serious mistakes in diagnosis. The crescentic variety is much less frequently met with than the other kind; it is probably as frequent on one side as on the other, and, in my experience, is much more difficult to treat, it being so low down, that muscular action can influence it in fewer directions. However, the same principles are to be observed in the treatment in both cases.

These two kinds of lateral curvature—the sigmoid and the crescentic—are the types of all lateral curvatures. There are, of course, a great variety in the ap-

pearance of lateral curvatures, but they may all be reduced to these two as the starting-point.

General muscular weakness in a young person renders such liable to spinal distortion, though this weakness be not at first accompanied by unequal action of the muscles. But, while this delicacy exists, any little faults of position or carriage, in sitting, lying, or walking, may subject certain groups of muscles to what is to them, in their weak condition, excessive strain and fatigue. Now, if this disproportionate fatigue of certain groups of muscles be kept up a certain length of time, the unequal action of the muscles becomes habitual and fixed, and we have the spinal column deviating from its proper direction in obedience to the force acting upon it. The most favorable situation for a young person to acquire the deformity under consideration, seems to be among the inmates of our popular boarding-schools, and it is notorious how many young ladies are thus afflicted. The hard, exhausting study, little proper exercise, faulty positions at desk, high bolsters, and much else that might be pointed out, if the subject were entered into, all conspire to induce this deformity; and, considering such special provisions made for it, the only wonder is that so many actually escape.

Weak ankles, often the result of the ungraceful and in other respects pernicious fashion of wearing high, narrow-heeled shoes, straining them by their rolling about, etc., may be an exciting cause of lateral curvature of the spine. The weaker ankle is generally the

left, and the individual soon forms the habit of standing on the right foot. Fig. 11 shows the effect of persistence in this habit. The lower portion of the spine is thrown to the *left*, and the dorsal portion necessarily thrown to the *right*. This does no harm in strong persons; but in the weak, certain muscles are subjected to great fatigue, by which they are rendered disproportionally feeble. The muscles subjected to the extra strain are those on the *right* side of the dorsal region (see fig. 9), or on the *convexity* of the distortion.

FIG. 11.*

Unequal muscular fatigue and consequent curvature caused by habitual standing on one foot.

But, as before intimated, *weakness* is not always or necessarily a concomitant of this deformity. It may exist in persons of both sexes who are muscularly strong. It is still caused even in these cases by unequal action of co-ordinate muscles, but produced by *over*-action of some muscles in certain regions, as the first is produced by *under*-action of the opposite and antagonistic groups; in either case, the balance is destroyed. Every one is familiar with the causes capable of producing strabismus, talipes, etc. From some unexplained cause, some muscles seem to take on a species of tetanic action, and after a time become shortened or retracted, and fixed in that state.

* These figures are, many of them, shown in mere rude outlines, so as to better show the position of the parts, but, of course, in treatment, any ordinary loose dress which will allow of free motion is worn.

Strabismus is most frequently the result of disordered digestion, and I have generally found, by diligently tracing the history of the patient back to the early stages of the disease, that lateral curvature of the spine in strong persons had almost always followed a long period of dyspepsia or other phase of disordered digestion. Unequal muscular action from this cause no doubt exists in all parts of the body; but, generally acting against the end of a single inflexible bone, no deformity can occur; while in the case of the spinal column, a deformity must exist whenever the conditions previously described are found.

But, given the deformity, what shall be the treatment? Shall we tie up all the muscles, and still further increase their weakness and irritation by wearing a "supporter?" Shall we ignore the physiological and anatomical relations of the different parts, and use an apparatus that acts upon the trunk as a whole, and by screws and braces attempt to straighten it out, as we would a crooked stick? There is a better way. It is very simple, and consists of *reversing* the process that produced the distortion. For curvature to the *right*, we must establish the conditions for causing a curvature to the *left* (should it be continued long enough), and continue the process till the spine is brought back to the proper position.

In this deformity, the two conditions of retraction and relaxation exist in the muscles acting longitudinally, respectively, in relation to the concave and convex sides of the spinal column; and our effort must

be directed in accordance with these conditions. By using eccentric movements on the concave side, to expand the retracted muscles, and concentric movements on the convex side, to contract and increase the power of the expanded muscles on the convex side—acting in the direction of this relaxation—we use the proper means to overcome the deformity. But it requires the nicest discrimination so to adapt a movement that the proper muscles will be affected in the right way, or else we may do harm instead of good. For instance, it was stated that a curvature may be produced by stronger action of the muscles of the right side. But this stronger action must come in a transverse direction—as by the scapular muscles, while those muscles acting longitudinally, as the intercostales, erector-spinæ, etc., are expanded, lengthened, and weakened by the bulging out of the convexity of the curvature; while too great action of those muscles acting longitudinally would act like a string to a bow, and produce the curvature to the left. Our effort must be, then, to place the patient in such positions and using such movements that these several different actions will be produced on different sections and opposite sides of the spine at the same time.

Fig. 12.

Restoring equal muscular action and reducing curvature, by standing on left foot and stretching up left hand.

We find that, almost without exception, in curvature

to the *right*, the *left ankle* is much weaker than the other. Movements of the foot must be employed, such as inward and outward flexion, twisting the whole leg from the hip, and many others calculated to strengthen the left leg, ankle, and hip.

The position shown in fig. 12 increases the strength of the left leg and ankle, and, at the same time, the lower part of the spine is thrown to the right, while the upper or dorsal portion is powerfully drawn to the left, by the position of the left arm. This position is opposite that represented on page 88, fig. 11. The patient makes a strong effort to *reach up*, and remains in that state a certain length of time—if possible, a minute. It will be seen how, in this movement, the left side of the spine in the upper part is expanded, and in the lower part contracted; while on the right side, the upper portion is contracted, and the lower portion expanded, all of which tends to unbend and straighten the S-shaped spine.

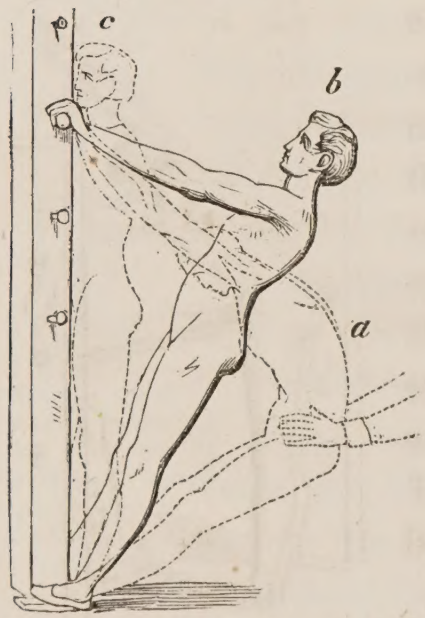
FIG. 13.

Acting concentrically on scapular muscles, and eccentrically on longitudinal muscles of left side.

Fig. 13 represents one method of causing such a regulated action of the spinal muscles as that, while some portions are expanded, others are shortened, and thus the spine is bent in a direction op-

posite to the deformity. The patient, with the left arm stretched up, leans over a bar, with his thighs resting against it, while the assistant grasps the left wrist, and presses upon the right shoulder. The patient now slowly raises the trunk from *a* to *b*. By the assistant's pulling at the left arm, the long leverage causes the scapular muscles attached to the spine—the lower portion of the trapezius, rhomboidii, etc.—to act powerfully in drawing that part of the spine to the left, while the pressure of the hand upon the right shoulder still further aids this action. The spinal muscles act the same as described in fig. 12; eccentric and concentric, on alternate sections and opposite sides of the spine. This latter result is still better secured if the right foot is carried away a little to the right, so that the principal weight of the body will fall on the left leg.

Fig. 14.



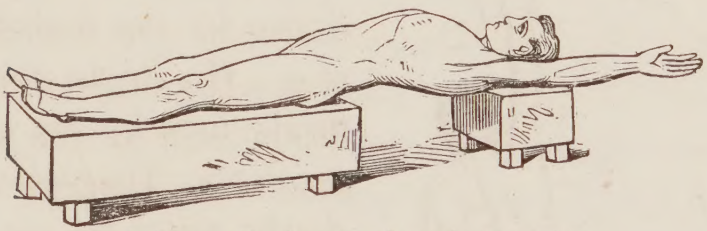
United action of scapular and spinal muscles to force the spine into its place.

The movement represented in fig. 14 secures all of the actions previously enumerated, and is especially powerful in drawing the spine toward the left. The patient stands with the right foot carried a short distance away from the other, so that the weight of the body is sustained principally by the left leg; he then

takes hold of the pin, at the height of the shoulder, with the left hand only, and then settles down, as seen at *a*. He now slowly draws himself up, against the resistance of the assistant—who holds him by the hips, as seen—to *b*, and finally to *c*, in contact with the pin-post.

Fig. 15 represents the patient with only the legs, hips, and head supported, the whole trunk being held up by the action of the spinal muscles. The position of the left arm, which is stretched up, with the action

FIG. 15.



Acting on the dorsal and cervical muscles.

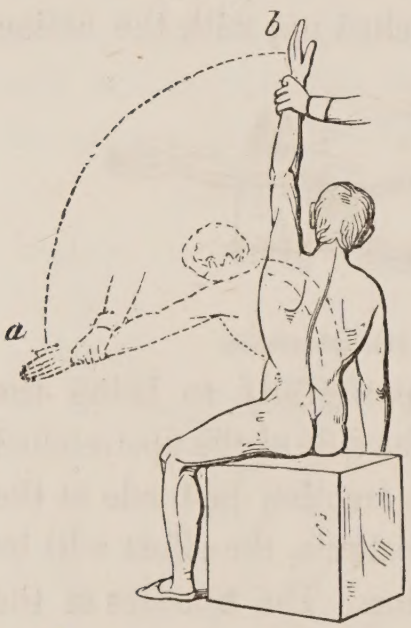
of the spinal muscles, acts powerfully to bring the dorsal portion of the spine to the side of the upstretched arm; and if, at the same time, traction be made at the *left* arm and *right* foot, by assistants, the effect will be still more to straighten the spine. The muscles of the back of the neck and upper part of the back are particularly affected.

The movements just shown are such as act more or less along the whole length of the spine, and are so contrived that their action is eccentric and concentric at different portions and opposite sides of the spine, as the muscles in the different sections are retracted or relaxed; the whole of which, taken together or separately, tends to restore the spine to its normal position.

But, as previously stated, the primary curve is in the dorsal region, and the incurvation above and below, in the opposite direction, are secondary or compensating curves, which must recede as the original curvature is straightened out. Our main efforts, then, must be to reduce the curvature which projects and pushes up the right shoulder.

Fig. 16 shows the patient sitting with knees wide apart, the left arm stretched up, and the trunk bent forward and well to the left, as shown by the dotted lines at *a*. His thighs should be firmly held by one or two assistants. The patient now slowly raises the arm and trunk from *a* to *b*, into the upright position, while an assistant, having hold of his wrist, increases the force by making resistance. It is a powerful movement. This muscular action is a concentric contraction from left to right over the convexity of the curvature, in the direction of the dotted lines. This shows how to contract the right side; the next figure (fig. 17) shows how to expand the left side.

Fig. 16.

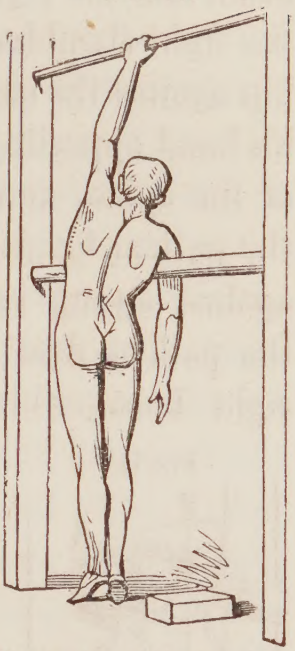


Concentric contraction of muscles on the upper portion of right side, from left to right.

The patient hangs by the *left* hand to a pole; not perpendicularly, for the trunk is pushed to the left by resting at the apex of the convexity, against a padded

bar. Thus there is a secured double action; viz.: a powerful expansion (eccentric) of the concavity, aided by the mechanical pushing force caused by the weight of the body against the bar. The weight of the body below the bar, and the muscular force of the left side and arm above it, make the fulcrum in the spine opposite the bar, which force above and below acts toward the right. The patient touches his toes or swings clear, and the bar is moved to the left or right according to the patient's strength, and as we wish to regulate the force of the movement. The patient remains in that position while he can, without discomfort. It expands powerfully the contracted side.

Fig. 17.



Expansion of the left side.

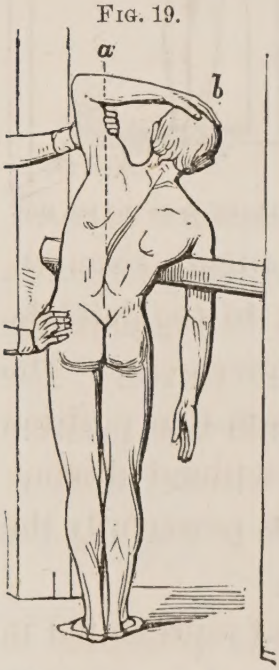
Fig. 18.

Contraction on right side above the hand.

The movement represented in fig. 18 acts in such a manner that the muscles on the *right* side of the upper portion of the spine are contracted, while those of the lower portion are prevented so far as possible from any special effort. The patient stands erect (*a*), with the left hand resting on the top of the

head, and the right hand on the back of the neck, that the right shoulder may be the lower, and with the *left* hip against the bar, as shown. The assistant then places his hand opposite, or just below the greatest incurvation of the spine, and holds very firmly against it, while the patient bends the trunk to the right (from *a* to *b*) against strong resistance. Care must be taken that the patient does not bend either knee, especially the right knee—which he will be very much inclined to do—for that would vary the effect, by varying the muscular action. With the legs and feet firm, the hips unable to glide to the left on account of the bar, the firm resistance of the assistant's hand opposite the apex of the curvature has the effect of preventing contractions below that point—cutting off the lower part of the body, as it were—so that the patient's force is confined to and expended on these muscles (erector-spinæ, intercostales, etc.), the contracting of which forces the spine to the left, and expands the left side, at the same time that this action is aided by the mechanical pressure of the hand. The spine is literally unbent. About the same thing is accomplished, in a little different manner, by the movement shown in the above illustration, fig. 19.

Fig. 19.



Bending to the right over the bar, contracting the right, and expanding the left side.

Here the hip is held from moving to the left by one

hand of the assistant, while the bar is opposite the curvature. The patient then bends over the bar to the right (from *a* to *b*), while the assistant, with the other hand, increases the force by pulling down upon the left arm. The hip should be firmly held, and the patient not allowed to rise on the toes.

A lateral curvature to the right is always accompanied with a horizontal *twist* of the spine on its axis to the left. The long diameter of the ellipse formed by a transverse section through the chest, which should be from side to side, is now from behind right to forward left, with corresponding depressions on the right side in front and on the left side behind. And the whole appearance is often strikingly impaired by this twisting of the trunk.

Fig. 20 represents a movement calculated to remedy this defect. The patient, firmly seated on a bench, with the knees apart, and with the left arm stretched up, bends the body forward and to the left, at the same time *twisting* still more to the left, as much as possible; the assistant's hand is pressed strongly upon the right shoulder, while the patient raises himself slowly to the erect posture, at the same time twists the right shoulder back and toward

FIG. 20.

A combined raising, twisting to the right, and backward flexion.

the right, and so continues to twist against the resisting hand, and finally bends backward and to the left again as far as possible, as shown in the cut. The motion is continuous from first to last, without stopping, following the direction of the dotted lines. The legs should be held firmly down by one or two assistants. This movement requires much skill for its proper execution, but, when well done, is an excellent one for the purpose intended.

But by far the most efficient single movements remain to be described. By the aid of nicely adjusted apparatus I have been able to contrive several complex movements, which can be given with great accuracy, and which accomplish several important purposes in one.

Fig. 21.

Complex movement for lateral curvature to the right—expanding contracted (left) side, unbending spine, and pressure on projecting (right) shoulder.

Fig. 21 represents an apparatus constructed specially to enable the operator to give a movement with more accuracy than it would be possible to do without some such aid, and with its efficiency correspondingly increased.

The patient stretches up the hands and takes hold of the handles (made to

slide up and down to accommodate persons of different heights) with the pad (which also can be raised or lowered), resting against the most prominent part of the projecting (right) side. There being a joint in the post opposite the pad, against which the curvature rests, it follows, that when the assistant presses down the treddle, the upper part of the post is bent over, carrying the part of the trunk above the pad along with it. Thus, as the left hand, being farther from the post, moves up and travels through the arc of a circle, the right moving but slightly, the contracted (left) side is strongly expanded (eccentric action for contracted muscles), the spine is literally straightened out or bent in the other direction, and there is actual pressure on the projecting shoulder, acting on the rigidity of the chest and spine, equal to the weight of the body against the pad. It is an admirable contrivance.

One reason why any ordinary muscular exercise fails to relieve the cases under consideration, is owing to the unequal flexibility of the spine in different portions of it. That portion embraced in the protruding arc forms an arch of almost unyielding rigidity, capable of resisting all attempts at flexion at that point while any other portion of the spine is more flexible. But while the rigidity of the dorsal spine, the protrusion of the angles of the ribs, and the contraction on the opposite side render a flexion to the side of the deformity difficult or impossible at that point, the curve in the lower part of the spine being in the opposite

direction renders that portion still more flexible than natural, and it is there where flexion ordinarily takes place. The narrow edges on that side of the lumbar vertebræ oppose as much less obstacle to the bending of the spine at that point, as do the wide edges to prevent the bending in the same direction farther up.

To meet this difficulty still more effectually than by the simpler movements, which have more reference to the muscles than to the osseous structure, I have contrived the following apparatus:

It consists simply, of an adjustable crescentic pad for the hips, and another similar pad for the side of the chest, also adjustable, and attached to a post hinged at the foot, and brought to and held against the side by a catch, as seen in the cut. The patient stands erect, with the left hip against the pad; then the spinal pad is brought up to and against the apex of the curvature, or just below it. Now, if the patient strive to bend to the right, he can only bend through the rigid part of the spine at the point of greatest curvature, where the spinal pad rests against it. Flexion below that point would be impossible. At the same time

FIG. 22.

Localized movement for lateral curvature to the right—contracting the expanded (right) side, unbending spine, and pressure on projecting (right) shoulder.

there is pressure on the prominent ribs equal to the muscular force used; as also an expansion of the left (contracted) side. It is difficult to tell which movement is most efficient, this or the one just previously described.

It should be remembered that, in illustrating this treatment, the object is simply to give example of movements—those which can be easily exhibited by cuts, and which can be seen at a glance to be applicable to the case under consideration. Thus, in lateral curvature, there are many movements which, perhaps, are as useful as any shown, but those already given sufficiently illustrate the principle of LOCALIZING the movements according to the anatomy of the body and the peculiarity of the deformity, in order to produce specific effects of different and often opposite characters, in contradistinction from general and indiscriminate use of the muscles.

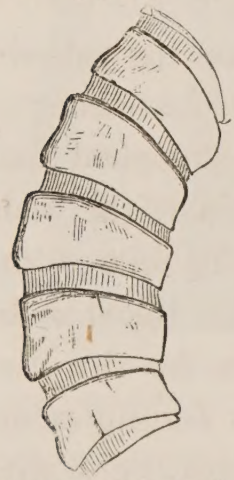
Thus I have given what I believe is the true pathology of lateral curvature of the spine, and have shown how to meet the case by appropriate treatment; a treatment that answers both the physiological and mechanical indications of the case. All the conditions of the patient's health should be taken into consideration in making up a prescription for this deformity, and the particular movements for different cases must vary accordingly. While treating a deformity we often have to treat other affections with it, which, of course, complicates the treatment. But with tolerable general health, and the case not too long standing—say from a few months to one or two

years—and I believe nearly all cases can be permanently cured. Indeed, I believe that with proper attention in youth there is no necessity for such a vast number of our women having this deformity at all. It is treated too lightly at first, till it becomes too formidable at last.

We can do almost anything with the muscles—can mold them almost at our will; but when the spinal bones and the long, stiff bones of the chest have become fixed in an altered shape, the changing of the distortion of the spinal column becomes a more difficult matter. The weak muscles are still weaker from long-continued strain or inaction, and the rigidity of the spine is a constant counteraction to their development.

But the greatest difficulty in these long-standing cases exists in the distortion of the chest and the conversion of the vertebral from symmetrical into wedge-shaped blocks, by the great pressure of the incurvation. Both the vertebral substance and the vertebræ are sometimes pressed to sharp edges by this constant force exerted on one side; and a stiffening and hardening of the column take place as years advance.

FIG. 23.



Section of spinal column, showing the wedge-shaped form of vertebræ in long-standing lateral curvature.

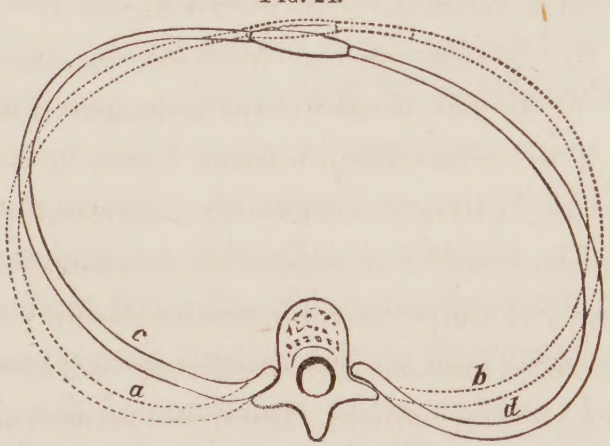
Fig. 23 is a very good illustration of a section of the spine after the curvature has existed for some time.

In recent cases, *while the spinal column is yet pliable*, the muscles can readily bring it to its proper position. And at any stage they

will do all that can be done to accomplish this result. The wearing of "supporters" is much worse than useless. Most of them are wholly inefficient to act, in any proper manner, on the osseous column, while they are amply sufficient to increase the muscular weakness which is the original cause of the deformity. The instrument made by Tamplin, of London, or some modification of it, seems to be the most sensible, for that does aim to act on the spine in an efficient manner; but, like all others that I have seen, or that must be worn on the person, it *holds up* the trunk, and thus weakens the muscles by preventing their action. In the long run, they are always bad. I need not argue this point, for this is the general opinion of the profession of the present day.

Fig. 24 illustrates the distortion of the chest, which accompanies all cases of lateral curvature of the spine.

Fig. 24.



Distortion of the ribs in lateral curvature. The dotted lines, *a b*, show the natural form, while the heavy lines, *c d*, show the distortion caused by the pressure of long standing curvature to the right.

It will be greater or less, according to the seat and extent of the spinal deviation. The figure shows a

transverse section of the chest, the dotted lines representing the ribs passing out from their articulation with a dorsal vertebræ, and passing in the normal shape forward to meet the sternum in front.

It will be seen that the largest diameter is lateral. The heavy lines show the same ribs as affected by a curvature to the right. The longest diameter of the chest is now diagonal, from behind right, to before left. The right side is pushed out behind and flattened in front, and the left side is flattened behind and projected in front. This is due to the fact that the spine, in its deviation toward the right, has, as it were, dragged the ribs after it, those on the right bending sharply close at the stiffest part, very near the angle, and the anterior portion being pulled out nearly straight; while on the left side the posterior portion of the ribs is straightened, which forces out the anterior portion next the sternum, and often tipping the latter up on that side, and depressing it on the right.

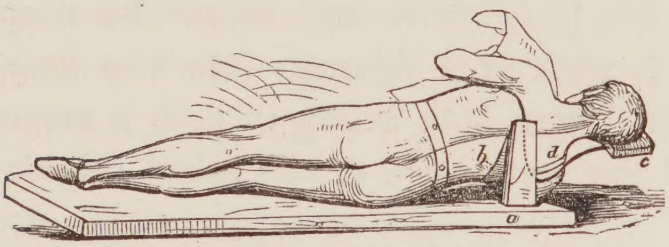
Now, the action of the muscles, previously illustrated, is quite sufficient in most cases to restore the spine itself to its perpendicularity. But in many cases, the muscles, already weak—the expanded, relaxed muscles of the projecting side—tire out too soon to act continuously enough on the osseous tissue, particularly the chest, to overcome the resistance of the rigid ribs, acting like so many elliptic springs against their action.

Our first object is to develop these muscles, and to expand their contracted antagonists, as previously illustrated. Our next must be to *aid* the muscles—not

to do their work, but work with them—in their action upon the spine and chest, to bring them back to their proper symmetrical position and shape. To do this, I have contrived a plan by which the patient can have a *continuous* movement, which will act for a considerable time on the vertebral column, to crowd it mechanically into place, and at the same time to expand the muscles of the contracted side. On the spinal column, the action is to force apart the narrow edges, and to press together the wide edges of the vertebræ, and hold them there for any desired length of time, thus reversing the side of the spine on which this pressure from the curvature is greatest.

Fig. 25 represents a contrivance by which this com-

FIG. 25.



The Eccentric Couch.

bined and continued movement may be taken, and which I have named the "Eccentric Couch." It consists simply of a flat cushioned bench (*a*), with two posts, about thirteen inches high, three wide, and one foot apart, as seen in the cut. From the tops of these posts is suspended a strap (*b*), made to buckle at one end, so that it can be brought close to the cushion or drawn high up. The patient lies down upon the couch, on the right side (in curvature to the right), with the

body resting on the strap (which is cushioned), at a point opposite the greatest incurvation, generally nearly under the right shoulder.

But the most important part of the contrivance is now to be described. A half-inch wire (well padded) passes under the left arm, across the chest, before and behind, to the right shoulder; then turning upward, passes to the right side of the head, and under it, as he lies on the right side. A strap (*d*) passes over the right shoulder, from the part of the wire in front to that behind; so that, when the head rests on the cushion (*c*), the right shoulder will be pressed down by the strap (*d*), and the left side lifted up or expanded by the action of that part of the instrument under the left arm. The result of the whole contrivance is to divide the body above and below the strap (*b*), on which it rests as a fulcrum, into two long, heavy, powerful levers, both acting in such a manner as to expand the incurvation of the spinal column at that point.

The amount of force is regulated by making the strap higher or lower, and there is also another adjustable contrivance—not shown in the cut—by which, when the head has descended a desired distance, or as much as the patient can bear, it rests upon a support, and the spine is there made to retain this straightened-out position as long as is required. As before stated, this is really a continuous movement, but it is such a one as the patient can do at home at convenient periods during the day. It should not be made irksome—and

the apparatus is so adjustable that it need not be—but is capable of acting with tremendous power. For these long-standing cases, as a part of the treatment, this contrivance is exceedingly useful, by its continuous action on the osseous frame-work, and especially to bring back the distorted ribs to their symmetrical shape and position.

It is always well to have a variety of means for accomplishing the same end, and for this purpose I have contrived another appliance for aiding the muscles in overcoming the resistance opposed by the distortion of the chest. For this distortion is really the greatest impediment which delays the cure, making slow what otherwise might be rapid; for it often occurs that the spine is brought back to its perpendicular state long before the depressed shoulder is raised or the projecting shoulder is brought back to its natural position by the elevation of the ribs on one side and their depression on the other.

But this object is accomplished, I believe, so far as human aid can accomplish it, by the following means:

The apparatus (fig. 26) is simply an addition to that illustrating the Localized Movement on page 100 (fig. 22). After the patient is made to bend powerfully over the pad several times, as in that movement, before the muscles have become too weary, the patient bends for the last time against the pad and over it, when the elongating lever on the opposite side is brought up quite under the arm, lifting up and pushing the upper

part of the trunk over the lever which is held against the apex of the convexity—bending to the right over the pad, generally much more than is shown in the cut.

The action of the apparatus is curious and interesting. If the curvature is not too great, all the phenomena of the deformity are reversed, and the curvature

Fig. 26.

Lateral transverse action at the middle and at each end of the curve to reduce it.

now appears with all its characteristics exactly on the opposite side. If, when not in the apparatus, it was to the right, now it is as plainly to the left, with the left shoulder projecting, and the right shoulder sunken, etc. The patient remains in this position while she can without discomfort. It is to be repeated as often as is necessary.

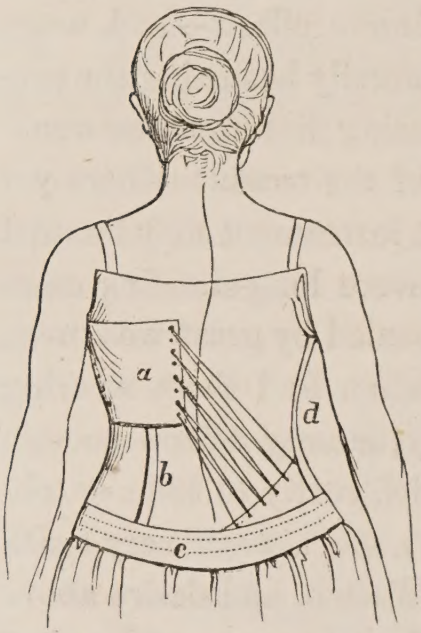
It will be observed that the object is to act in accordance with the muscles in overcoming the osseous resistance (and thus far aiding in their development), an object quite different from that contemplated or

possible in an apparatus to be worn where muscular effort or development is hindered.

While the wearing upon the person of any instrument is seldom curative in its ultimate effects—and when adopted in the early stages, generally hastening the progress of the deformity by increasing that muscular weakness which is the first cause of the trouble—there yet may be cases where some light instrument may be used as a palliative merely. In severe long-standing cases of middle-aged ladies, accompanied by great weakness, and no hope of recovery, we often find them wearing instruments—frequently heavy, clumsy affairs enough—ostensibly as temporary relief, really to hide or obscure the deformity; for they are always very sensitive on the subject of their affliction, and desire above all things to hide it. Hence there has appeared a class of corset instruments which have the one good quality of covering up the deformity. When such an instrument is only used by incurable cases with the simple object of palliation, it is to be commended; but when a young girl is encased in an affair which prevents or hinders muscular exercise, and she and her friends are persuaded that obscuring the deformity is curing it, the practice is mischievous and reprehensible. For middle-aged ladies especially, and occasionally for younger people—when there is not sufficient muscular strength to sustain them—the instrument represented in fig. 27 possesses advantages over others in that it is light, hides the deformity, and gives support only where it is needed, without lessening freedom of motion.

It consists of an ordinary lady's corset, with a wide hem (*c*) at the bottom, in which is concealed a thin, flexible steel band, passing entirely *around* the hips—not over them—and locked by a simple contrivance in front, where the corset fastens together. The figure represents a curvature to the left, as will be seen. Over the projecting side (left, in this case) is stitched a piece (*a*) with eyelets on each side. These eyelets are for laces, which pass thence to pieces stitched on the corset near the band (*c*), in front and behind. A crutch (*d*), also concealed in the cloth, comes up from the band (*c*) to under the right arm. Beneath the piece (*a*) is a broad piece of block tin, held up by a light, thin steel strip (*b*), attached to the band (*c*). Now, by tightening the laces, the piece (*a*) is made to press down on the projecting shoulder, and the same force lifts the crutch (*d*) up under the drooping shoulder. It is all put on and off like any other corset, and is scarcely heavier. For the incurable cases for which it is intended, it is really an excellent thing. But I never allow patients to wear it so long as there is a prospect of cure by movements.

FIG. 27.

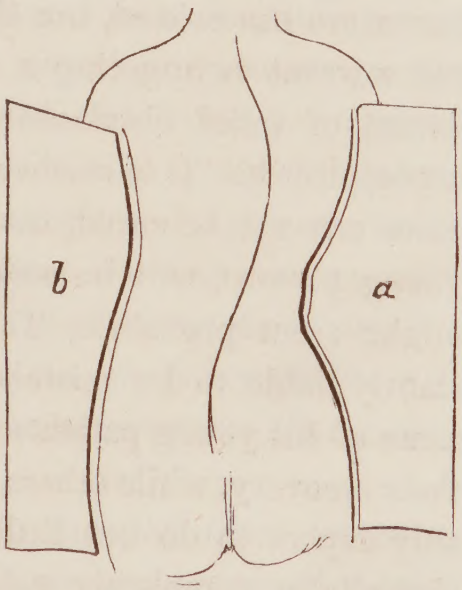


Corset for securing lateral pressure and palliation in incurable cases.

This subject would not be complete without a de-

scription of the proper method of making a correct and reliable measurement of the extent of the deformity. The method usually adopted of marking the course of the spine is unreliable and untrustworthy, for the reason that it is practically impossible, in the majority of cases, to know exactly where the spine is. Unless the patient is very thin in flesh, the spine is hidden deep in the tissues, at least in a part of its course, and this obscurity is increased by the twisting and bending caused by the deformity. A better way is to get the body-lines, by laying a strip of lead along each side, from the axilla to the trochanter, then over each shoulder, from neck to hip, and another across the shoulders from arm-pit to arm-pit, and then carefully laying it off, and marking on a piece of pasteboard, which can then be cut into the shape or pattern of the side. Thus the form of the body is most accurately taken. The name of the patient and the date should be written on each piece, and then they should be carefully laid away.

FIG. 28.



Taking the pattern (*a* and *b*) of the body-lines as the measure of the deformity.

Now, as the variations of the body-lines from the symmetrical form are caused by the spinal distortion, so any return of the spinal column to its normal posi-

tion will be exactly marked by the variations of the body-lines toward the natural symmetry. By only applying the pasteboard patterns (of which *a* and *b* are samples for the sides only) to the patient's sides, a moment is sufficient to tell exactly how much the patient has improved. The height should also be taken, which will increase as the straightening out of the spinal column progresses.

With reference to the prognosis when a case of lateral curvature is presented for treatment, it must be said that neither the age of the patient, the time the curvature has existed, nor the extent of the deformity, can warrant us in giving a definite opinion as to the extent of relief obtainable, or the time required to accomplish it. It is neither certain that long-standing cases can not be cured, nor that recent ones, even in young persons, will be so readily cured as at first it might seem probable. The physician will be constantly liable to be mistaken in his expectations, for some of his young patients will be slow and tedious in their recovery, while others, for whom he might reasonably expect to do but little, to his surprise often get partially or completely well. As a general rule, the younger the patient and the less the deformity the better the chances are; and the older the patient and the longer the deformity has existed, the least likelihood will there be of effecting a perfect cure; but still, all cases are so liable to the above exceptions, that it is always safest to be cautious in predicting results other than to say that all benefit which the patient

is capable of receiving, will be effected by the treatment.

The reason is this: In the beginning of the curvature there is a certain amount of pliability in the osseous frame-work, by virtue of which the bones have adapted themselves to their altered situation; the vertebræ become thicker on one side and thinner on the other; the ribs on the side of the curvature are bent sooner and shorter behind and correspondingly flattened in front, and on the left side they are flattened behind and projecting in front, and the transverse diameter of the chest is changed to a diagonal one, as was illustrated in fig. 24. All these changes in the forms of the solid bones have taken place—it might be said, have been allowed to take place—in consequence of the yielding nature of the bones under pressure. But the time arrives when the bones have attained such solidity that they yield much less readily to pressure; and after that time ordinary causes will not produce a permanent curvature, except after acting a long time.

And if the bones of the spine and chest have become thus stiffened by a greater proportion of earthy matter entering into their structure, and this having taken place after their shape has been altered by the long existence of the curvature, then their resistance renders recovery much more prolonged and difficult to attain.

But we can never tell to a certainty, except by actual trial, till the patient has passed the meridian of life, what state of flexibility or rigidity exists in the osseous tissue.

In some little girls, whom one would suppose were as pliable as could be asked, their bones seem to have early arrived at a great degree of immobility and even rigidity, which prolongs the treatment much beyond the anticipated time, while some young ladies of twenty or twenty-five having had a spinal deformity for ten or fifteen years, yield quite readily to treatment in consequence of retaining great mobility of the bones. But by perseverance even the worst cases, while good general health continues, can receive substantial benefit.

Average cases—those where the curvature has existed from four to ten years—require from one to two years of daily treatment, but some cases recover much sooner, even in a few weeks or months.

One young lady, aged twenty years (sent by an eminent surgeon of this city), had a medium-sized lateral curvature to the right, which had existed for a number of months, and was rapidly increasing. The strain on some of the spinal muscles, owing to the rapid increase of the deformity, was so great as to cause soreness and swelling in them. Her treatment was divided between the deformity and other troubles. At the end of two months the curvature had entirely disappeared, leaving not the slightest deviation of the spine from its natural position.

A little girl, aged eleven, had a slight lateral curvature to the right, of four years' standing, caused by sliding down stairs, hanging by the banister. Commenced treatment February 19th; left, April 27th,

cured. Another patient, still under treatment, nine years old, with a curvature of four years' standing, and with equally good health, progresses decidedly, but so slowly that two years will be required to complete a cure.

Another young lady, aged twenty, in good health, and with a good amount of muscle, having a prominent curvature to the left, which had existed since she was twelve years old, had it so far reduced in six weeks that she was obliged to alter and refit all her dresses. The change in her form was remarkable.

A young lady, aged seventeen, very strong and healthy, and capable of taking a large amount of treatment, having a curvature of some eight years' standing, had such immobility of spine and ribs that, after three months' trial, there was only a very slight alteration for the better. These are not average cases.* The majority require a year or more, and, by perseverance, mostly recover.

In some cases of twelve years' standing, and the patient twenty-five, or even thirty years old, the change which can be effected in their form is great, though where great rigidity exists, considerable time will be required; still my experience, in perhaps a hundred cases, has proved that patience and perseverance will be crowned with unanticipated success.

* Cases are introduced in this work only to illustrate, and not for "show.

CHAPTER V.

PARALYSIS OF MOTION.

PARALYSIS not a Disease of the Muscles, but of the Nerves—Its Pathology—Its Curability not determined by the amount of Paralysis—Organic and Functional Paralysis—After the Shock, Reaction should take place before beginning Treatment—Medication in First Stages deprecated—The Proper Hygiene—INDICATIONS for TREATMENT—Common Exercise uses most the unaffected Muscles—How to Reverse this—Concentrating the WILL upon Paralyzed Muscles by Localized Movements—The process by "Exclusion"—Double Efforts of Corresponding Affected and Unaffected Parts—The Circulation in Paralyzed Muscles—Reflex Nervous Action—The process by "Concentration"—Constipation of Bowels in Paralysis—Spasms of Muscles—Inducing Paralyzed Patients to make Efforts—The use of ELECTRICITY—Contrast with Innervation—Dr. Todd's Views—"Apoplectic Diathesis" denied—Tabular Statement of Cases—Remote Causes of Paralysis—CASES and REMARKS—Infantile Paralysis—"Withered Limbs"—Favorable Results of Treatment—Cause of Infantile Paralysis—Difference between Certainty and Readiness of Muscular Action—Explosive Movements—Cases of Local Paralysis, Paraplegia, Hemiplegia, Atrophied Muscles, etc.

IN the last chapter we have seen how a mechanical effect may be produced by properly localized movements, made in accordance with the physiological condition of the tissues acted on—whether relaxed, requiring concentric, or retracted, requiring eccentric movements, as explained in Part First of this work. Thus far, all has been clear and reasonable. But can we reach the more subtile and occult phenomena of the system—the nervous action, for instance? Let us examine the basis for treatment in PARALYSIS OF MOTION.

Muscular motion takes place only in consequence of a stimulus imparted to the muscular fiber through the

medium of the nerves, and paralysis of motion occurs generally, *not* from defect in the muscular tissue itself, but because of an interruption of this stimulus. Paralysis is, therefore, a disease of the nervous system, and paralysis of innervation might, perhaps, be the more appropriate expression. The cause of this interruption of the passage of the impulse of the nervous centers to the peripheric nerve-loops, in contact with the muscular fiber—which is the normal stimulus to muscular contraction—may be either mechanical, as the pressure of a clot or effusion, with or without rupture of the vessels, effusion of serum into any of the cavities, concussion from blows, etc., or it may be physiological, as the cutting off the supply of nutrition, from chronic inflammation of the membranes, thus interfering with the capillary circulation in the nervous substance; or disease of the nervous tissue itself, as softening, tubercular deposits, etc., or both the mechanical and physiological causes combined. There are also, probably, some rare instances of this affection, involving the "peripheric brain," or ultimate extremities of the nervous fibers.

While the prognosis, in cases of paralysis of motion, should always be guarded, it should be governed less by the degree of paralysis than by considerations of the character and seat of the lesion in the nervous system. A slight degree of paralysis may be very intractable or wholly incurable, while some cases of complete loss of power may very nearly or perfectly recover by proper treatment, and sometimes, indeed,

spontaneously. While a certain amount of obscurity must necessarily attend these cases, yet it is of the utmost importance that great pains be taken to secure a correct diagnosis.

The difference in the curability of different cases depends very much on the early history of each case.

A disease in the cerebral hemispheres, for instance, may slowly progress for years, till a comparatively large portion of the substance of the brain has become implicated, and yet no violent symptoms occur, but a gradual debility comes creeping stealthily over certain portions of the body. So insidiously, indeed, does this often happen, that the patient himself is almost unconscious of his malady till it has already existed for some time. Evidently such a case, with the disease inducing the paralysis still progressing in the nervous center, is much more formidable, though attended with but a slight loss of power, than in a case of an opposite character, where the system is overwhelmed by the *suddenness* rather than the extent of the lesion. A very small clot may produce complete hemiplegia, while cases have been known where extensive abscesses have occupied a portion of the brain, attended by much less paralysis; the former have a good chance of recovery, while the latter are necessarily incurable. Still, the obscurity previously mentioned, and the difficulty often encountered of getting the exact history of the case, render it proper that each case should have the chances of a trial.

The fact that the paralysis is often disproportionally

greater than the lesion—and this occurs in the majority of cases—leaves a large amount—in many cases the *whole* amount—to be accounted for as entirely *functional*, and should be considered separately from that immediately produced by the organic disease.

While we can not always hope to remove the organic lesion, the functional paralysis may often be entirely removed; and in those cases where the totality of the symptoms depends entirely upon a continued interruption of innervation, from a previous powerful impression or shock upon the nervous system, the paralysis will be removed, although the organic lesion may possibly remain unaltered. Or, in less favorable cases, the improvement will continue up to the point of actual interference of the organic lesion with the transmission of the nervous force. But this is not all, for it fortunately happens that the very means pursued to remove that portion of the paralysis due to functional derangement of the nervous system, is also highly conducive to the removal of the original organic disease.

It is well known that restoration of impaired nerve-function, as well as restoration of impaired nerve-tissue, takes place very slowly.

Even the slight pressure of the fingers on a nervous trunk, as of the ulna, where it passes over the internal condyle of the humerus, will so far paralyze the little and the ulnar side of the ring-finger, that several minutes elapse before we can get complete control of them.

Should this pressure be continued a certain length of time, the paralysis would doubtless be more or less complete, though the nervous tissue might remain perfectly intact. Now, there are various ways in which paralysis of motion may exist, and be continued indefinitely, without organic lesion in the nervous centers, except so far as imperfect nutrition always accompanies a loss of function. Any cause, local or general, capable of temporarily overwhelming the nervous centers, may produce paralysis, and, when once produced, though the cause be removed and no organic lesion remain, the paralysis may continue; because the function, once lost, is with difficulty re-established, owing to the low nutrition in the nervous tissues while the cause existed — during which time the function of innervation was suspended, causing a certain amount of deterioration in the conducting power of the nerve.

The paralysis in such cases may be compared to the steam-engine, which may have every requisite of motion so far as steam is concerned—valves open, etc. —but which stands still till the first revolution has been imparted to it from without; this first revolution of the wheel affording the conditions for the next to follow, and so on, each turn of the wheel making the next one possible.

So in suspended function of the nervous system, it requires the first motion to make the next motion possible. To accomplish this first motion, as in the illustration, special conditions adapted to the case must first be instituted.

Thus, we often meet with paralysis of a limb, in children, which continues through life, though robust health may have followed the fever or other disease producing it. Many cases also recover, but not until the corresponding member on the other side has got the start of a year or two in growth. Also, cases of paralysis, arising from Pott's disease of the spine, frequently recover after anchylosis has taken place, and the pressure from effusion removed, or the inflammation has subsided.

That the distinction between the paralysis due to the organic lesion, and that depending on functional derangement of the nervous system—the latter, it is true, set in train by the former, but still distinct from it—is well founded, is illustrated in what is denominated "hysterical paralysis." A lady suddenly loses her voice, or even is attacked with paraplegia or hemiplegia, which often lasts for months, but is not caused by the slightest organic difficulty in the brain or cord. It is entirely functional, but none the less real on that account, though of course much less dangerous. Still, a shock has been produced, though we may not be able to tell what produced it; and, when once produced, it continues to exist as an independent condition.

The same may be the case when the paralysis has been produced by a more appreciable cause. Cases 2, 3, 4, and 19, in the tabular statement on page 145, are samples of absolutely perfect restoration; in one case (2), after a lapse of over five years from the time

of the accident. At that time there was probably compression of the brain, and perhaps a clot; for the child was comatose for several days, and, I think, for more than a week. For a year or two before commencing the treatment, the paralysis had increased; but, as the recovery was perfect, it can not be supposed that the original organic lesion existed up to the time of commencing the treatment.

Another case illustrates, if possible, still more forcibly this view, because it is one in which we are cognizant of the character and extent of the original disease. Master D. F., now eleven years old, six years ago was kicked by a horse in the right fronto-parietal region—a portion of the skull, about three inches long by two and a half wide, being detached and forced under the adjacent portion of the skull, projecting into and lacerating the substance of the brain. It was removed with great difficulty. Unhealthy granulations, and even an abscess formed on the exposed portion of the brain, and, after a tedious convalescence, in one year the wound healed. He was not trephined.

After the accident, he remained comatose for twenty-four hours, when consciousness returning, it was ascertained that there was complete hemiplegia of the left side. At the end of a year he could walk, and continued to be able to do so up to the time I saw him, six years after the accident. But he could not sustain his weight on that leg; the development of the whole side was very much retarded, the *bones* as well as the muscles of the left side being much smaller than on

the right; the left arm was nearly useless, and, though he could move it about from the shoulder considerably, there was not the least control over the hand and fingers. The fingers were flexed into the palm, and the wrist upon the forearm. For the last year he had been getting considerably worse. His intellect was unimpaired. After three months' treatment, there was a wonderful change for the better. He could use the hand and arm to climb a ladder with great facility, and he was even beginning to feed himself, being able to grasp a fork; his form had changed, being perfectly upright, instead of stooping and favoring the left side in every movement, and he walked with only a slight hitch. This case is interesting, because we know that while there has been a remarkable amelioration in the patient's condition—an increase of power in the paralyzed side, of several hundred per cent.—there can not have been the same change in the original lesion. Indeed, as there only remains the cicatrix, it is not likely that there was much alteration of the condition of the brain.

But whatever may have been the cause of the paralysis—whether effusion into any portion of the cerebral mass, inflammation of the membranes of the chord or brain, the shock of violent disease or other cause—the first indication is, of course, to ascertain the cause and remove it.

Unfortunately, in most cases, even the proximate cause lies beyond our reach, except by indirect means. Where the access of the disease has been gradual, the

treatment may cautiously commence; but in recent cases, especially if they are severe, much treatment of any kind is to be deprecated. The nervous system is already overwhelmed by the force of some powerful shock, and, till it has had ample time to recover, and has recovered so far as it is capable of reacting, any efforts to act on or through it will be in danger of doing harm instead of good.

The rule that surgeons apply to cases of severe injuries, before performing an operation, is equally applicable here. We must wait for reaction to take place. It may be several weeks or several months, according to the nature of the case and the recuperative powers of the system.*

Whatever may be the utility of medication in some stages of this disease, I regard the exhibition of strych-

* In a clinical lecture, by Professor Trouseau, inserted in the *Gazette des Hopiteaux*, we find the following:

"As a general rule, M. Trouseau does nothing in cerebral hemorrhages. He does nothing, because he regards cerebral hemorrhages *as an accomplished fact*, and he does not see how a medicine can be useful when there exists a hemorrhagic principle (tendency) in a corner of the brain. He asks: What can bleedings, purgatives, or cuppings accomplish against the pressure of a foreign body—a clot on the brain? Blood-letting, they say, has the effect of depleting the sanguineous vessels, and, in depleting them, we also weaken the absorbent vessels, and thus favor the resolution of effused blood. But ecchymosis of the brain should not be treated differently from ecchymosis of the skin or cellular tissue. But when a man has received a violent blow upon the head, or when a child has fallen and bumped his forehead, we limit our treatment to external applications of salt and water, or make light compression, or, better still, do nothing at all. Resolution takes place as well, or better than if we had done something."

M. Trouseau's success, since adopting this course, has been much better than formerly.

nia in the first stages of paralysis, goading up the nervous system, already completely exhausted, as being particularly harmful.

It adds nothing to the capacity of the nervous system, while it still more completely overwhelms it. But every hygienic means should be brought to bear in the first stages of this disease. Special attention should be paid to the diet. Paralytics are very apt to live badly, taking altogether too much food to be properly disposed of in their confined condition; they often eat to surfeit, without being aware of it. There is also great deterioration in the quality of general nutrition, interstitial change taking place much more slowly, and much less perfectly than in health—so much so, that the odor arising from the body and breath of paralytics is precisely like that of very old persons. Even the expression of countenance and intellectual manifestations have the same senile character.

Oxygen is the great purifier, and the patient should be kept in the purest atmosphere, which should be allowed to come in frequent contact with the skin, to yield its tonic effect to that organ, in order to excite respiration; and tepid spongings of the body will be found useful for the same respiratory purposes, as well as for cleanliness. Of course, such special medical treatment as is indicated by the present condition of the case—as, for instance, to cause absorption of an effusion or clot, to attend to the digestive and depurating functions, to support the strength, etc., by any means best calculated, in the physician's judgment, to accom-

plish these purposes—should be employed at this stage of the disease. In the absence of the pressure of muscular contraction, œdema of the extremities may be relieved by frequent kneading with the hands and pressure on the soft parts; but in cases accompanied by spasmodic action of the muscles from reflex influence, it is not common to find œdema.

But, besides plenty of pure air, no more plain food than can be vigorously digested and properly assimilated, and whatever may be embraced in general hygiene, there is very little that can be done, in recent cases, without danger of injury, until the system begins to react from the shock. Even without treatment, or in spite of treatment, many cases do react, and after a while entirely recover; but the great majority of cases convalesce to a certain degree, and there stop. It seems impossible, with the treatment usually adopted, to get them beyond a certain point.

But suppose the system has had time to react after the inception of the disease, or suppose the progress is gradual, the patient becoming conscious of having less and less control over certain members, what are the indications of treatment? The principal indication evidently is to re-establish the connection between the muscles and the brain. This is to be done in the same manner that it is done in health, viz., *by the use of the muscles.*

In health, every movement makes the next movement possible. In paralysis of motion, how shall the first movement be accomplished? After long inaction

—first from disease, and subsequently from habit—how shall volition be communicated from the central to the peripheral brain? Let us follow nature.

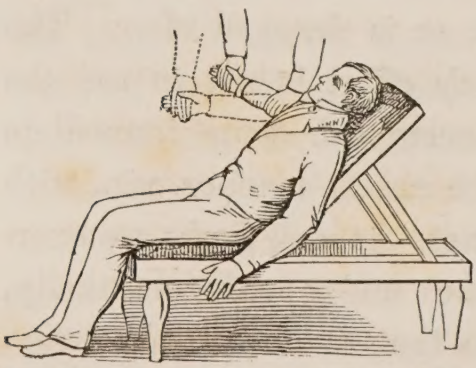
The object is a definite movement; the means are muscular contractions; the cause is the will. We attempt to accomplish this, first by a process of exclusion; that is, we exclude all other movements while attempting to perform the required one; and not only that, but the attempted movement must be accomplished in every case without a single failure.

Suppose a case of hemiplegia. The patient has no ability to raise the arm; and not only that—he has lost even the power to try. No person can attempt anything which he *knows* he shall be unable to perform. There is no special tendency in ordinary exercise to overcome the paralysis. In every effort it is the non-paralyzed muscles which act, and this condition of things is kept up by every movement. In walking, for instance, in hemiplegia, the unaffected side walks, and the palsied side rides, or is dragged after. The reason is, that the patient's effort is not to use the paralyzed limb, but to accomplish some immediate object, which is done in the easiest manner, viz., with the unaffected limbs. Hence, the well limbs are overused, and the paralyzed ones under-used continually, in all common exercise, so that, even with the lesion which first produced the paralysis entirely removed, the relative disproportion of muscular and nervous action is continually kept up by every ordinary attempt at voluntary motion. I mean the direct or

remedial influence—the indirect or general utility of almost any exercise, in paralysis, can not be denied—so that, in a paralyzed patient, his volition, with reference to his paralyzed side, if not entirely gone, is reduced to its minimum quantity. A simple effort of the will, at the physician's request, does, in such circumstances, but very little good.

An effort of the will, to be of any service, must be recognized in the peripheral as well as central brain. How can the peripheral brain be made to recognize volition, so as to impart its stimulus to the muscular fibers with which it is in contact? In the first place, the patient must be placed in such a position that all voluntary muscular motions to keep himself in position will be avoided; he must be either lying or half lying, and in such a manner that, being supported in all directions, and perfectly comfortable, he will employ no other muscles than those belonging to that portion of the paralyzed side which it is determined to act upon.

FIG. 29.



Sample movement for paralysis—making effort to move the paralyzed arm while the unaffected muscles are at rest.

For instance, suppose we wish a flexion and extension at the elbow. Having placed the patient in the position above described, we take the paralyzed arm in our hands, and, extending it horizontally, rest the arm firmly against our thigh, holding it firmly with one

hand, while with the other we grasp the forearm, near the wrist. It will be remembered that the patient is in such a position that neither innervation nor arterial blood—both of which are necessary to muscular contraction—will be diverted to any other part by any other movements. This is very important to remember in the treatment of this disease; for if, at this stage of the treatment, other movements are going on at the same time, the volition will be diverted from the paralyzed muscle to those more easily affected and already occupied, thereby seriously interfering with the intended movement.

Now tell the patient to bend the elbow very slowly and very gently, and not to exert all his power in the effort. We are supposing a case of complete loss of voluntary motion. It is well known that, if a man in perfect health should exert all his available force in a single effort, or succession of efforts, the consequence would be a diminution of power, and even a decrease in the size of the muscle, rather than an increase of them. The same rule will apply as much more forcibly to the paralytic, as his fund of available force is less than in the healthy.

In commencing the treatment, the object is to direct volition to a particular group of muscles, and nowhere else at the same time, in order to obtain the maximum amount of muscular contraction with the minimum expenditure of force; but, as in health, where a succession of such efforts are to be made without fatigue, so here only such an intensity of volition is employed

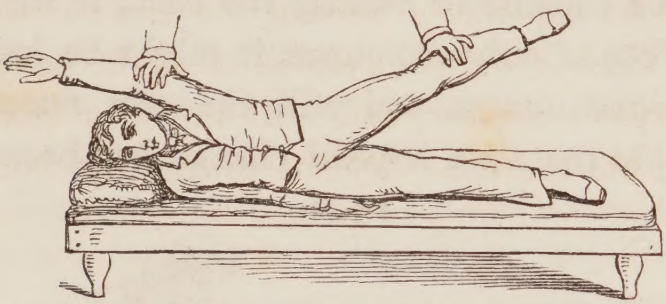
as can be repeated a certain number of times with equal force, without exhaustion. In order to guard still further against the ill effects of too great effort, only three or four are made at one time, when the patient rests. Eight or ten different movements, given at one sitting, are enough for one day. By doing a little, we accomplish something; but, by over-doing ever so slightly, we destroy all the benefit that preceded.

At the first moment that this effort is made by the patient, without waiting to allow him to see whether or not the forearm moves, the arm is to be carried in the required direction, as though the flexion had been done voluntarily. Thus we have an effort concentrated upon a particular part, and a movement following the effort, though as yet, perhaps, not as a consequence of it. But something certainly has been accomplished, even in the muscular tissue. In the flexion of the limb, there is the stretching of the extensor muscles, and the mechanical contraction of the previously stretched flexor muscles, as in health; both affecting somewhat the capillary circulation, and making some impression upon the peripheral nerve-loops, sending in turn at least a reflex influence toward the central brain, and thus the effect of the movement is doubled.

The effort, though gentle, should be concentrated, well sustained, and determined, in order to accomplish which, the will of the operator should always operate through the patient. It is not enough that the patient be told what he is to do, and then be left to do it as

well as he can—for inability to do this is the essence of his disease—but, in everything he does, he must

FIG. 30.



Sample movement for hemiplegia, where the effort can effect only the left (paralyzed) side.

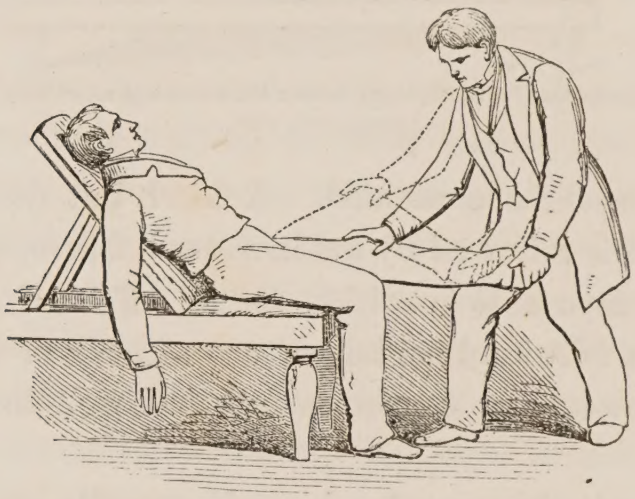
act only under a command. A kind, but determined command is followed by an increased desire, which is the most favorable condition for an effectual volition, because a volition thus begun commences at its maximum power, and continues full and well-directed to the end.

Although the operator himself actually makes the movement which is perceptible to the eye, namely, the flexion of the forearm in the case supposed, it is more to secure the *morale* of the patient—for he sees it move while he is trying to move it; he can not tell how much of the movement belonged to himself, but feels and hopes that he helped some; and, as his effort was slight, perhaps he could do more. Yet, in all hopeful cases, there probably is a certain amount of contraction resulting from every effort, but, being insufficient to make the sensible motion, it ordinarily is not appreciated. This usually unseen and unknown penetration of the will into the tissues, toward which

it has been sent, and the hope of being able to increase it, constitute our basis of expectation.

Suppose a force of two pounds of muscular contraction to be capable of raising the arm; if we began with a force of only one ounce, it might be increased to thirty-one ounces, and still the arm remain unraised; but the most hopeful change has been going

FIG. 31.



Sample movement for paraplegia—extending the leg against resistance—while no other muscular action is possible.

on in the nervous and muscular tissues, while yet there is no palpable result. If we have formed the habit of obedience in a few muscular fibers, this habit and the increased nutrition resulting from this functional act may, in time, extend to others, till the normal condition is fully or partially restored.

We may avail ourselves of still another means of assisting volition to accomplish its purpose. I allude to the dual arrangement of the organs, and the tendency to symmetrical development. Now, if the patient be made to bend both the sound and the paralyzed

limb at the same time, and in the same manner, taking care that the will is equally intent upon both movements, it will increase the tendency of the paralyzed muscles to act in concert with the unaffected ones. But such movements should be used only a part of the time. I have mentioned that innervation and muscular contraction take place under the influence of arterial blood. The will exerts a powerful influence upon the circulation, increasing it in the part toward which it is directed. This is another reason for the gentle and continued effort, thus allowing time for the circulating fluids to arrange themselves under this stimulus.

But mechanical means may sensibly aid in effecting this result. During the cessation of voluntary motion, the circulation in the capillaries becomes enfeebled, and increased exosmose of the fluids takes place through the distended walls of the vessels; the stagnant blood becomes more venous than arterial, and is infrequently purified by being brought into contact with the oxygen of respiration, owing, in a great measure, to an absence of the mechanical pressure to which the contents of the capillaries and other fluids are subjected, during health, by the tonic contraction of the muscle containing them. This mechanical aid may be partially supplied from without, by means of pressure of the hand, and kneading of the muscles with the hand and fingers. The retarded circulation that may thus be accelerated in its passage forward to the heart and lungs, would be laden with impurities, to be eliminated at the proper emunctories.

To carry out our attempt to imitate nature, and follow her method of substituting a physiological for a pathological condition, we endeavor to induce an arterial condition of the capillaries, by stretching the

FIG. 32.

Movement for paralysis—concentrating the will upon the paralyzed muscles, while the others are at rest.

palsied muscles, or kneading them while in an extended position.

Reflex action is to be avoided, because contractions produced in this manner, being entirely abnormal, seriously interfere in establishing the control of the will over the muscles, which is the object aimed at; but direct action may be stimulated, in some cases, by gentle pressures along a nervous trunk, or on a plexus of nerves, slight percussion along the spine and over the sacrum, etc.; but these stimuli should never be used where there is reason to suspect organic lesion of the medulla spinalis.

It is a remarkable fact that though some kinds of organic diseases of the chord are hopeless of recovery,

yet, being characterized by frequent spasms of the muscles, they are not attended by that wasting away of the muscular tissue which usually follows paralysis unaccompanied by such reflex contractions, though the latter justifies a much more favorable prognosis. Muscular contraction, though abnormally produced, favors the circulation and nutrition in this tissue, though the nature of the disease prevents the penetration of the will beyond the seat of the lesion. But spasms of the muscles which accompany resolving or functional disease of the nervous system, do not seriously interfere with the treatment or the progress of the case.

The foregoing remarks are applicable to complete paralysis of motion; but in those more favorable cases of partial paralysis, where the will has regained, or has never been deprived of, a portion of its control of the muscles, the principles of treatment indicated in complete palsy are equally applicable, with the addition of another method of still more perfectly concentrating the will upon the designated muscles. As the first method may be called the process of exclusion—that is, excluding other portions of the system from participating in a movement—so this may be called the process of concentration, or concentrating all other muscular efforts of the whole body upon the designated member which will be cumulative in the palsied muscles.

There being still some power in these muscles, such movements, besides those previously explained, may be given as require contractions in other muscles be-

sides the affected ones; but how feeble soever the contraction of the affected muscles, the contraction of the other muscles, be they ever so remote, should always be *less* than in the affected ones, and should be only such as are necessary to complete the contemplated movement in the paralyzed muscles. For instance, in hanging by the hands (though this would be seldom used in paralysis, being too violent) it will be seen that, from the necessities of the case, all muscular efforts in all parts of the body are rendered necessary from the position, and that the force of contraction gradually increases from below upward, and is most intense in the hands and arms. And as the volition and contraction converge toward the upper extremities, so do the innervation and circulation flow in the same direction. This is what may be called a *cumulative* movement. But the same care should be taken to avoid fatigue, as in the first case, and all through the treatment this idea of calling out only so much force as can be easily and pleasantly borne, and the depression consequent on which can be quickly rallied from, and that leaves no exhaustion behind, should be kept in view.

It would be difficult to illustrate by wood-cuts this class of movements—but the principle once well understood, the tact of the physician will be exercised to secure such positions and movements as will carry out the principle in practice. Any position or movement, requiring greater force in the paralyzed muscles to retain the position or make the movement, than is made by the other muscles, and where the muscular action

in the unaffected parts, though less, is in consequence of the effort of the paralyzed muscles, would be such a cumulative movement. By a little contrivance, a great variety of such movements can be adapted to the requirements of any case where they are indicated.

In paralysis of motion, the principles just laid down should govern the construction of every prescription of movements. But there are other indications that may be responded to by the use of movements. Those cases of paralysis that arise from congestion of the dura-mater, or any abnormal nutrition of the membranous envelops of the chord, will have this morbid nutrition diminished by inducing a higher nutrition in the contiguous muscles of the back. This may be accomplished by various flexions of the back in different planes, such as will bring the dorsal muscles into action; at the same time the movement acts directly on the chord itself, through the ligamentum dentata, thus supplying a healthy mechanical stimulus to the chord. But we should not make any of the above-mentioned movements till we are sure of a good circulation in the extremities. Indeed, a peripheric circulation once thoroughly established, central congestions will be proportionally lessened. This may be attained principally by movements on the unaffected portions of the body, such as will promote an arterial circulation in the extremities.

Some of the most annoying symptoms in cases of palsy are connected with the bowels and urinary bladder. Paraplegia is almost always connected with con-

stipation of the bowels and incontinence of urine. The constipation is often so severe as to require large doses of the most powerful cathartics to effect an evacuation of the bowels, which being repeated every few days, seriously interfere with the patient's chances of recovery. The constant liability in some cases to, and the annoyance and inconvenience of, involuntary urination is a great source of depression and discouragement to the patient. The treatment for these cases is so simple, that many might refuse to employ it, but the efficacy of which is fully confirmed by experience.

In constipation depending on paralysis of the nerves controlling the motions of the lower bowels and the sphincter ani, the treatment must be adapted to this indication. We must act through the capillary circulation and innervation of these parts. This may be done by acting by mechanical means from without inward. Let the patient be laid on his back, his arms stretched up over his head and held by an assistant; then, with both hands laid flat on the abdomen, make a rapid shaking or vibration of the abdomen and its contents (see fig. 10). This may be followed by kneading with the fingers along the course of the ascending, transverse, and descending colon, pressing deep down into the tissues. If spasm of these muscles should follow the vibration, then the arms need not be raised over the head, or the knees can be raised and held by an assistant, or the shoulders can be elevated, the object of which will be to relax the muscles of the abdomen; but the treatment in that case will not be

so efficacious as if applied over the extended muscles. Also, in the same position, the legs may be raised by the patient himself, bringing the abdominal muscles into action. For paralysis of the bladder and the sphincter ani, the thighs are held flexed upon the trunk, and a vibration is made with a blunt stick upon the perineum. Gentle percussion across the hips, from one trochanter to the other, and slight pressures along the sciatic nerve, where it issues from the pelvis, will stimulate the nerves given off to the lower bowels.

This simple local treatment, with the tonicity induced by the general treatment, is often sufficient to overcome ordinary cases of paralytic constipation and incontinence of urine. Where there is troublesome spasmodic action of the muscles, this is best overcome by very slow bendings of the joints, while the patient remains perfectly passive. The spasms which take place in the muscle on first being put to the alternate stretch and relaxation, will gradually subside as the nerves become accustomed to those impressions so nearly resembling normal contraction. Where there is spasmodic action of the muscles following an effort, the volition being divided, as it were, and scattering to different muscular groups in remote parts, great pains must be taken to concentrate the will upon the designated member. Indeed, in many of these cases, nothing but the greatest tact, patience, and perseverance can effect a cure.

Of course a treatment like that which is now being described, acting entirely on the general and local

nutrition, through functional manifestation, implies a certain amount of time and considerable patience ; yet, considering the nature of the disease. the progress in some cases is remarkably rapid.

Dr. Batchelder, in his excellent report of cases of paralysis, treated by him with *exercise* in the New York Hospital, mentions the difficulty he found in inspiring these sufferers with sufficient ambition, and that they were generally satisfied with slight improvement, and refused or neglected to make further effort.

Now, I never have encountered any such difficulty, but rather the contrary. Making due allowance for the difference in the character of my patients from those to be found in hospitals, yet I think it was mainly owing to exhaustion following the kind of exercises that his facilities allowed him to contrive for them, though he seemed sensible of the injurious effects of over-doing. Greater precision and less effort have an encouraging effect upon the patient's mind, especially when he sees, day by day, that he can do many little things that before were impossible.

Electricity has been a good deal used in the treatment of paralysis, and even now almost all physicians resort to it when other remedies fail, as though the last hope lay in its employment; but it seems to me without sufficient reason either in experience or philosophy. I know it has been held by respectable members of the profession, and is now largely entertained by certain among lay people, that the nervous system is a sort of galvanic battery, that the nerves are electric

conductors, and that innervation is the conduction of electricity. And where these views are not entertained, there seems to be a sort of tacit acknowledgment that electricity somehow ought to be good for paralysis, if we only know how to administer it. Let us look for a few moments at the scientific bearing of the electrical treatment, for it is one of those means that charlatans seize on to prey upon the credulity of the public, to the detriment of legitimate medicine.

Innervation is an organic functional act, subject to the same organic laws of waste and repair of the tissue performing it as all other manifestations of function. This we know by the large amount of phosphates and other constituents of nerve-substance to be found in the urine after excessive mental exertion, fright, hysteria, etc., the same as urea is thus found after great muscular effort. A little reflection will discover that there is much less analogy between the nervous force and electricity than is commonly supposed. The idea of *supplying* it to the system is even more absurd than the supposition that, because India-rubber and muscular tissue are both elastic under certain circumstances, the former can be substituted for the latter! Besides, this idea of *introducing* electricity ignores the manifest qualities of this imponderable agent itself. Electricity is not an entity—a substance that can be poured into or through anything, like a fluid, but is a *condition*. Polarization in solid conductors, and electrolysis and decomposition in fluid conductors, is all there is of what is called the passage of electricity, and there is

no more scientific reason, from its nature, for supposing it would be remedial in any manner whatever than any other chemical agent. And as organization in the nervous substance is necessary to its restoration, and as the conduction of electricity is chemical change or disorganization (electrolysis), diseases of the nervous system would seem to be ill adapted to the employment of this remedy. And such I believe to be the case.

Dr. J. C. Dalton, in his admirable "Treatise on Human Physiology," just published, shows that various other agents, mechanical and chemical, besides electricity, will cause muscular contraction; that there is no electrical current in a nerve excited by electricity, which excitation is due entirely to its power of producing mechanical or chemical irritation; and that nothing so quickly exhausts the natural irritability of the nerve as electricity. This is so much so, that while nervous irritability remains for several hours after death, in ordinary cases, yet it is wholly wanting in animals killed by electricity. In experiments on dead animals, instead of the nervous irritability and muscular contraction continuing longer under the use of electricity, as it should do if this theory of its use is correct, it very speedily disappears altogether. This is not to say that electricity may not be a valuable remedial agent, but the genius has yet to arise that shall place its employment upon a scientific basis. When the cause of the paralysis is unmistakably muscular, as where there is retraction or relaxation of the

elastic and muscular tissues; or when there is any reason for wishing to modify the quality of the fluids and the organic processes in the cell-formations in the mass of the tissues, then electricity may be employed, within certain limits, to advantage. The chemical change occurring with the passage of electrical currents affords a certain amount of stimulus that may be salutary while not extending to lesions in the nervous system, where we can not afford to make cause for repair beyond that occurring as a part of its own functional manifestation.

Dr. Robert Bentley Todd, an authority whom none will dispute, in his "Clinical Lectures on Paralysis and Diseases of the Nervous System," on page 152, says:

"You will often be consulted as to 'some expedient for promoting the restoration of the paralyzed limbs to their normal condition.' To this question, after having given a fair trial to the various means which have been proposed for this purpose, I must reply, that I know of nothing which more decidedly benefits the paralyzed limbs than a regular system of exercise: active when the patient is capable of it, passive, if otherwise. As to the use of electricity, which is now much in vogue, or the employment of strychnia, which has been recommended, I feel satisfied, as the result of a large experience, that the former requires to be used with much caution, and that the latter is apt to do mischief, and never does good. I have seen cases in which, after the employment of electricity for some time, that agent has apparently brought on pain in the head, and has excited something like inflammatory process in the brain. And so strychnia also will induce an analogous condition of brain, and will increase the rigidity of the paralyzed muscles. Some good may occasionally be effected by the use of friction, or cold water, or shampooing, all of which tend to improve the general nutrition of the nerves and muscles."

No better idea of the results of the treatment can be given than is shown in the annexed tabular state-

ment, of my first twenty cases, comprising *all* who were treated from January, 1857, to March, 1859. The relative curability of different forms of paralysis by the Movement-Cure is here well exhibited. Among these twenty cases are several where, from the first, there seemed no hope of success, and which will hereafter be rejected; but it was deemed advisable to test the virtues of the treatment, by applying it in the worst cases as well as where there was greater probability of success. Even in some of the worst cases, which had been given up as hopeless for years, great improvement was often realized.

But when cases, like several in the list, experience a complete restoration of all of the lost functions—after, perhaps, several years of nearly suspended animation, reformation of muscles and its connecting tissues, and a sensible increase of even the bone itself taking place—it exhibits a power of controlling and directing the nutritive processes unequalled by any other therapeutic means.

One thing has been quite noticeable, viz.: all other things being equal, the benefit has seemed to be very much in the inverse ratio of the amount of treatment previously received.

The common idea that apoplexy is more likely to occur in peculiar constitutions, having what is called the "apoplectic diathesis," does not seem to be borne out by the facts. Indeed, I do not believe there is such a *diathesis* as the "apoplectic." Out of about fifty cases, not more than two or three exhibited

any approach to the short neck and plethora supposed to be favorable to paralytic attacks, but the majority were rather the opposite, being spare and anæmic.

Cases.	*Patient's Age.*	*Since the First Attack.*	*How long under Treatment.*	*Probable Cause.*	*Patient's Condition.*	*Results of Treatment.*
1	10 years.	1 year.	2½ mos.	Pott's disease of spine.	Partial hemiplegia and loss of sight of one eye.	Perfect restoration.
2	7 years.	5½ years.	2½ mos.	Fell from the bed to the floor when one and a half years old.	Complete hemiplegia at first; restoration in one year, except the right leg, which was "withered;" foot deformed; could walk with difficulty; no voluntary motion below the knee.	Perfect restoration of function; foot perfect in shape.
3	12 years.	6 years.	8 mos.	Cerebral inflammation.	Paralysis of the left arm; could use the fingers a little; no power over the upper arm; forearm supinated.	Restoration, except of the deltoid, which was atrophied.
4	14 years.	6 mos.	5 weeks	Dislocation of the elbow.	Paralysis of the right arm, especially of the fingers, which were flexed.	Perfect restoration.
5	36 years.	2 yrs. and 4 mos.	4 mos.	Obscure.	Complete paraplegia, with slight improvement after first attack; no control of sphincters; inveterate constipation and incontinence of urine; could not stand, etc.	Remarkable improvement; perfect control of the sphincters; bowels regular; walks about with canes.
6	40 years.	1 year.	7 weeks	Tabes-dorsalis.—Has had syphilis.	Paraplegia; could merely crawl; great stiffening of the limbs.	No improvement.
7	5 years.	2 mos.	8 mos.	Pott's disease of the spine in its active stage.	Complete paraplegia soon after commencing treatment.	No improvement of paralysis; subsequently recovered, after anchylosis had taken place.
8	45 years.	3 years.	2½ weeks	Syphilitic meningitis.	Paraplegia.	No improvement.

Cases.	*Patient's Age.*	*Since the First Attack.*	*How long under Treatment.*	*Probable Cause.*	*Patient's Condition.*	*Results of Treatment.*
9	44 years.	23 years.	3 mos.	Fell upon the curb-stone 23 years ago.	Has not walked since the accident; attempts at movements attended with clonic spasms.	Improved in all respects; obliged to suspend treatment while still improving.
10	38 years.	2½ years.	1 mo.	Obscure –excessive smoker.	Partial hemiplegia; could walk with aid of crutches.	Much improved, especially in the use of the right hand.
11	22 years.	1 year.	3 mos.	Probably small clot in the left cerebral hemisph'e	Partial hemiplegia; could do business.	Considerable improvement.
12	74 years.	1 year.	3 mos.	Apoplectic attack.	Could walk with difficulty, dragging the right leg. Not the slightest use of the right arm; fingers flexed into the palm.	Great improvement. Walks with ease and naturally up and down stairs alone, and can use the right arm a little.
13	13 years.	11 years.	2 mos.	Unknown	Nearly complete paraplegia.	Slightly improved.
14	45 years.	2½ years.	2½ weeks	Syphilitic.	Paraplegia; could walk with assistance.	No improvement.
15	43 years.	1½ years.	1½ mos.	Syphilitic.	Paraplegia.	No improvement.
16	36 years.	1½ years.	5 weeks	Syphilitic.	Complete paraplegia. Had not sat up for four months; alvine discharges passed involuntarily; incontinence of urine.	Much improved; can control alvine discharges and sit up and move the limbs.
17	21 years.	8 years.	10 mos.	Uncertain	Atrophy and retraction of the muscles of back, thighs, and hips.	Very great improvement.
18*	10 years.	5 years.	3 mos.	Kick of a horse.	Hemiplegia.	Great improvement. Atrophied muscles vivified, etc. Continues treatment.
19	47 years.	1 month	2 mos.	Obscure.	Hemiplegia, which passed off in a few days, leaving great weakness and numbness in the affected side.	Perfect restoration.
20	50 years.	2 years.	2 mos.	Some affection of the chord.	Paraplegia; could walk about with canes.	Marked improvement. Continues treatment.

* This case is related on p. 122.

The conditions favorable to the disease seem to be disordered nutrition, the quality rather than the quantity of the blood, and especially an unhealthy condition of the vessels—ætherometous deposits being found wherever a rupture can be traced. It is true that "good livers" sometimes have apoplexy, but it is more probably because their habits deteriorate the processes of nutrition than that they are "too well nourished"—an impossible occurrence.

While the treatment above set forth aims primarily to re-establish the function of the nervous system, it at the same time tends to promote a more perfect nutrition in all the tissues, thus lessening the probabilities of recurrence of the original disease, of which there is always more or less danger. And it is an interesting and gratifying fact, that *not one* in the above list has ever had an increase or even exacerbation of the disease since the first commencement of the Movement-Cure treatment. These cases had all exhausted every other means, as a consultation of the column of "time since first attack" will at once suggest.

From March, 1859, till the present time (October, 1860), about thirty more cases of paralysis have been treated with results not varying materially from those exhibited in the table, so that it is not necessary to add them to it. But most of the cases have continued much longer under treatment, and many that after three months would have been set down "improved," could now be called "cured." One feature is of great interest. The proportional number of cases

of paralysis that had occurred in infancy is constantly increasing, and these are the very best cases to treat. The result in many of these cases is truly remarkable.

The case mentioned on page 122 has been a very instructive one.

Just one year from the time he commenced, namely, in December, 1859, he resumed his treatment at my office.

The development that had begun the year before had kept steadily on. The chest and shoulders were symmetrical, so that the wadding before placed on the left side to make the shoulders appear even, had to be entirely removed; and he was stronger throughout that side.

But here comes the most interesting part, so far as treatment is concerned. I observed in his case what I have in many other cases, viz.: that while the muscles might be brought under the *control* of the will; while they might be made to act correctly and strongly, they would not always act *readily*.

In this case, though the muscles of the left leg were strong, and would move as desired, they would act only tardily. He had muscular strength enough to walk without limping, yet he limped. When he stepped with the left foot, there seemed to be a loss of time after the effort before the action. The leg would partially give way, for a moment, under the weight of the body, before the muscles would contract so as to sustain him firmly upon it, and yet, when this contraction did take place, it was sufficiently powerful. Hence the conclusion that in the physiology of muscular motion

there is a difference between certainty and readiness of action.

It occurred to me, that as we can develop certainty of action by concentrating the will upon a part and *prolonging* this effort, we might secure rapidity of action by *sudden* efforts thus concentrated. I therefore adopted a system of movements involving sudden *explosions*, as it were, of effort upon the affected parts. This was done by causing the patient to make sudden, jerking movements from point to point, with as much precision as before, but with the greatest rapidity he was capable of. For the leg, a favorite movement was lying on the face and rapidly bending the knee by swinging the leg. Such movements do not so sensibly increase the power of the muscle as its readiness of action. This process was kept up for two months with more than anticipated results. He gained nothing in strength or certainty of movements, but in readiness and rapidity of muscular action there was as much improvement as there had been before in control of it.

He can now walk with scarcely a perceptible difference in quality of movements in the two sides. Muscular contraction follows immediately upon the effort, so that the settling down of the left side in walking, before so marked, is scarcely perceptible.

The principle of distinguishing between the different qualities of force, and the peculiar kinds of functional manifestation to be employed in order to secure the desired quality, has been applied in many other cases with uniformly favorable results.

Another important matter in the treatment of paralysis is to secure a good circulation of blood in the affected parts before attempting much voluntary motion in them. Innervation as well as muscular contraction takes place only in the presence of arterial blood. Before the patient essays to move a paralyzed limb, especially at the beginning of treatment, the muscles should be stretched (passively) or made to act through position or reflex action (as standing on a paralyzed leg, for instance, while held in position by assistants), when one is often surprised to notice how readily the previously rigid muscles will move in obedience to a volition. A few cases will better illustrate the treatment.

John Erskine, a lad fourteen years old, was brought to me on the 27th day of April. Six months before, he met with an accident, causing a backward dislocation at the right elbow-joint. It appeared to have been properly re-set, and though there had been adhesions, they had been broken down, and at that time there was perfect motion of the forearm, both of flexion and rotation. But from the first there had been nearly complete paralysis of the whole arm, but much more complete below the elbow. This state continued with scarcely any improvement up to the time I saw him, six months after the accident. At that time there was great emaciation of the whole arm, but especially of the hand. Indeed, the muscles of the hand seemed to have disappeared, and the skin of the palmar and dorsal surfaces could be brought in apparent contact be-

tween the metatarsal bones without difficulty. Extension of the fingers was impossible, but he could contract them slightly; they remained in a drawn up and crooked position. The hand dropped and remained in the position where its specific gravity brought it while wearing his arm in a sling. There was impaired sensation, and the hand felt cold to the touch. This case, though sufficiently severe, yet arising from a local cause, showed a most remarkable recuperative power. He was treated nearly every day for about five weeks, when he was dismissed, *cured*. He had perfect motion even in those muscles—as the adductors of the thumb —that seemed at first to be completely palsied, and the increase of muscular tissue was remarkably rapid; sensation and warmth returned, and when he left, there was only a slight difference in the size and power of the muscles of the two hands. About a month later, I heard by a fellow-patient who saw him, that the muscles of that hand had attained their full size and vigor.

This case is a very simple one, and is principally important as clearly illustrating the view of the pathology of curable cases of paralysis of motion, previously presented, namely, that the paralysis may exist after the initial cause has long since disappeared; and that, unless peculiar conditions are instituted, favorable to the re-connecting of the brain with muscles, the paralysis may be indefinitely prolonged.

The next case is of a different nature. A gentleman from Connecticut, thirty-six years old, a large, well-formed man, but not plethoric; married; of very

temperate habits; an artist by profession, felt numbness in the lower extremities on the 15th of March, 1856. He failed rapidly till the middle of April, by which time there was complete paraplegia — there being neither voluntary motion nor sensation below the diaphragm. After the first few months he rallied somewhat, and became able to sit up a little, and could move the left leg with tolerable facility, but the right leg remained nearly useless; there was slight power in the extensor muscles, but none whatever in the flexors; sensation very imperfect, and he had remained without sensible improvement for about one year. Commenced treatment on the 4th of May, 1858. At that time he had not had a single voluntary evacuation of the bowels since his first attack, more than twenty-seven months before, and the amount of medicine taken and the number of injections used to effect a passage were enormous. There seemed to be complete paralysis of the sphincter ani, and the evacuations were of a flattened shape, like a knife. The urinary bladder was also equally affected, the urine passing involuntarily at all times, rendering the wearing of a urinal constantly necessary. He complained of a sense of tightness, as of a band drawn around the waist; there were also frequent spasms of the muscles of the leg—especially the right leg—often causing the limb to take on a jerking vibratory motion, which was excited and aggravated by attempting to move, as of turning in bed. These clonic spasms often lasted six or eight hours, without cessation. He could

not stand alone for a moment. He was under my personal care and treatment about two weeks, when his father, being a physician, took him home, and continued the same treatment at his own house. When he left he could stand alone, and take several steps with assistance; had a perceptible increase of power and motion in both legs, especially in the right, the flexors of the knee having been brought under control; could do his part in all the duplicated movements required of him, and, for several days before leaving, had had free, spontaneous evacuations of the bowels of the natural cylindrical shape. Two months subsequently, namely, about the middle of July, I saw him at his father's in Connecticut, where the treatment had been continued as well as their facilities afforded, up to that time. At that time he mentioned that he had had no incontinence of urine since the day he left New York; bowels were regular, and the sphincter ani continued to perform its functions; he could get up and down with perfect ease, and could walk about the room, and even out to the neighbors, with a little assistance. In fact, all the symptoms of paralysis were gradually subsiding, and sensation and motion were slowly returning. He continued to improve till he could walk all over the village by the assistance of a cane in each hand. He then resumed his business of portrait painting, and has continued in about the same condition ever since. One leg is quite good, the other obeys rather tardily. The bowels and bladder continue in good condition.

The following is a sample of the results of treatment in paralysis following apoplexy in old people. It is the case of a lady, seventy-four years old, who, ten months before, had experienced an apoplectic attack, followed by complete paralysis of the right side. Reaction to a certain extent followed, so that when I saw her she could walk alone, and get up and down stairs with help, but she had never been able to move, in the least, the right arm. She walked as such persons usually do, dragging the right leg.

This had been her condition, without improvement, for some months. Two months' treatment enabled her to get considerable use of the right arm and hand (the fingers were previously strongly contracted into the palm), and she could get up and down stairs alone, lifting the right foot and putting it forward, as others do. In all other respects the improvement was as marked. Here was a member (the right arm), previously entirely useless, to a certain extent restored to use. When last heard of, a year after the treatment ended, she was able to attend church regularly, and was but slightly incommoded in her movements.

A case of facial paralysis from exposure is interesting. A gentleman, while riding in the cars in Germany, was subjected to a strong current of cold air, coming through the window upon his face, during the first part of the night. Arriving at his destination, he retired to bed as usual, but on arising the next morning, he found the right side of his face had lost all sensation, motion, and expression. His mouth was

drawn down toward the left side, and he could neither open nor shut the left eye. He was treated in Paris, but without relief. On the 12th of August, 1859, six weeks afterward, he applied to me. There was complete paralysis of the right side of the face, probably caused by congestion of the facial branch of the fifth pair, owing to the exposure. In the treatment of this case, much benefit was derived from gentle percussion with the finger ends along the principal branches of the facial nerve, and especially over the parotid gland. He entirely recovered in a few weeks.

In cases of paralysis in elderly people, or where the recuperative energies of the system are exhausted from any cause, and the lesion in the nervous centers can be only imperfectly repaired, there can, of course, be only a certain amount of amelioration effected in the paralyzed limbs. But this amelioration is often considerable, and goes far, by establishing a better circulation and a better general as well as local nutrition, toward warding off subsequent attacks.

But the most brilliant results are attained in those cases of paralysis in infancy, childhood, and youth, where, whatever may have been the cause of the cerebral disturbance, the original cause has been entirely removed, and the general health established, except as to some single member, as an arm or leg, which ordinarily remains in a paralyzed condition the rest of life, and becomes, by the arrest of its growth, what is commonly called a "withered limb."

This forms a most interesting class of cases, from the

fact that they have been generally abandoned by the profession as hopeless of relief, while in my experience they are the very best of all cases of paralysis to treat. The recuperative energy of a child is great, and, by proper efforts, many of these so-called withered limbs may be made useful members. And when we reflect that what is done to a child is done, it may be, for a long lifetime, it increases the interest connected with any means of relief in these cases. This infantile paralysis generally arises from some debilitating cause, as "teething," fevers, affections of the bowels, or falls, and sometimes, indeed, as in adults, without any apparent existing cause.

A little girl from Rhode Island, seven years old, came under my care the third day of March, 1857. When one year and a half old, she met with a fall which brought on a gradually developed paralysis of the right side. Of this, however, she recovered so far as to get nearly perfect use of the right hand, though it is somewhat the smaller of the two; but the right leg, after the first efforts toward recovery, seemed to get no better, but rather grew worse. It was one inch shorter than the left, and very small and feeble. She often fell down in walking, and could not sustain the weight of the whole body on it for a single moment; whenever she attempted to do so, it would immediately give way, and precipitate her to the floor; there was great relaxation of the ligaments of the foot and ankle; the toes were drawn down toward the heel, particularly when she was excited; indeed, the bones

of the foot were so loosely held together, that they could be easily moved upon one another with the fingers; and there was general indication of relaxation in that leg. She was under treatment about two months and a half, at the end of which she could use that leg with very great facility and strength. It grew larger and stronger, being able to sustain the whole body with ease, even while curtseying upon it till the leg was bent at right angles with the thigh, and then could raise into the upright position again; the foot was natural shaped, and the former relaxation about the ankle and foot was nearly gone.

This case had also a lateral curvature of the spine to the right, caused by the short leg and weakness of that side; but it was entirely removed by the treatment, and a recurrence prevented, by causing her to wear a cork sole on the right foot, so thick that the right hip is of the same height as the left. The cure in this case is complete. It is now three years since she received the treatment, and the form and use of foot and leg are perfect, and but a little smaller than the other.

A very interesting case of paralysis, occurring in infancy, is that of a young lady, aged twenty, whose right arm, including the shoulder, was completely "withered." Since she was three months old—at which time she had a fever, taken from her mother, which resulted in paralysis of the right upper extremity—she has had no use of that member, except of a very slight character. The arm was emaciated to the

last degree, the joints relaxed, and it was almost destitute of muscle. She could not flex the fingers, except by first shortening the flexors by throwing back the hand, the extensors of the wrist being most active. She could not raise the forearm by the flexors, and the triceps extensor seemed to be entirely incapable of contraction, and hence no extension of the forearm was possible. The deltoid was atrophied, and the ligaments so relaxed that two fingers could be laid between the head of the humerus and the glenoid cavity. The forearm was supinated, and the arm usually hung helpless from the shoulder. Although the case seemed a desperate one, yet the result has been very gratifying.

After treatment for four or five months, there was marked improvement, even in so severe a case, and she has now really considerable use of her arm. But the amount of the improvement is of not so much interest as that she could improve at all. It was extremely interesting—almost exciting—to watch the development as it occurred in different parts of the arm, and at different times. It was several months of constant effort before the deltoid which at first appeared completely atrophied—began to act. The adductors of the thumb, after weeks of repeated trial, suddenly contracted with considerable force, drawing the thumb into the palm. It was probably the first time these muscles had contracted since she was an infant, three months old—twenty years before. I had noticed that the adductors of the thumb had considerably increased

in size (they were previously almost wanting) for some time before this sudden contraction occurred. She has never lost the power thus suddenly gained.

Another case is of a lad twelve years old, who had had the brain fever eight years before, resulting in paralysis of the deltoid, and partially of the whole left arm. A perfect restoration followed four months' treatment. The paralysis was nearly or quite complete, for he could not raise the arm at the shoulder in the least. The restoration is complete.

Paralysis of the deltoid and anchylosis at the shoulder-joint occurred in a girl of fourteen from a fall. The anchylosis precluded all motion, and on breaking it up crepitation was found. A good joint has been formed, and the paralysis of the deltoid has been overcome. She can now hold a ten-pound dumb-bell over her head with that arm. The cure is complete.

The next is one of the so common cases of infantile paralysis from inanition, or, as the term is, from "teething." F. L. has had a "withered" leg since he was fourteen months old, at which time he was paralyzed. He is now eight years old. The right leg is two inches shorter than the left, soft, feeble, and almost muscleless. He could support his weight upon it about ten seconds. He has now employed the treatment about four months, and can stand on that leg without resting for forty minutes; it has commenced to grow, is quite strong, and a very useful leg.

A large number of such cases might be given, but

there is much sameness in the record, both as to origin and results of treatment.

Generally, at the age of from twelve to twenty-four months, the paralysis occurs, arising most frequently from some cause of inanition, such as fevers, teething, with accompanying digestive and cerebral disturbances, etc. The child usually escapes with paralysis and arrest of development of one arm or leg, and, though often recovering perfect health as to the rest of the system, there is no improvement of the affected member.

The general course seems to be this. There is at first complete paraplegia or hemiplegia; but after a time nature seems to make an effort at recovery, and generally succeeds in all but one member. Usually the recovery is complete, so far as it goes. But this is not always the case. I have now several cases of paraplegia where the recovery is partial in portions of each member. And curiously enough, the weak and the strong parts are opposite on each leg. For instance, a small, weak hip, on the left side, is accompanied by a strong thigh and a weak calf; while a strong hip, on the other side, is accompanied by a weak thigh, a strong calf, etc. The same is true when comparing flexors and extensors of corresponding parts of each limb.

There is one class of cases who get no benefit from the Movement-Cure treatment, and that is those "fast" men who have had syphilis, and have undergone heroic treatment for it. After the paralysis has existed

a few years, they generally experience an unceasing "drawing" of the muscles of the lower extremities, denoting that the envelop of the chord have become implicated in the characteristic inflammation, which is the forerunner of disorganization of the substance of the chord itself.

The cases given are simply to illustrate the principles of treatment, and need not be amplified or extended. They had all tried the virtues of ordinary exercise, as well as other means commonly resorted to in these cases.

CHAPTER VI.

THE CIRCULATION OF THE BLOOD.

CONTROLLING THE CIRCULATION—Cold Extremities the Cause of Congestions—Why Voluntary Exercise does not always induce a Peripheric Circulation—Localized Movement on Extremities—Strong Localized Muscular Action without increased Arterial Action—Centrifugal Circulation—Physiological and Mechanical Effect of Muscular Contraction on the Venous and Arterial Circulation—Stretching the Muscles.

IF the attempt, in the preceding chapters, has been successful, it has been shown how, by proper localized movements—in contradistinction from irregular efforts, which might hinder or interfere with, instead of assisting, a depressed function or organ—certain special physiological purposes may be accomplished as a direct result.

We have seen thus far that designated groups of muscles—as in lateral curvature of the spine—may be developed independently of other muscles, so as to cause a muscular action with reference to the spinal column, opposite that which produced the curvature, with the effect of ameliorating or curing the deformity.

We have also seen that even the nerve of a paralyzed muscle may be aroused by assuming the conditions necessary for volition to reach it, and that it is possible to re-educate it to something like its former

functional capacity. So much, then, being under our intelligent control, when managed so as to correct abnormal conditions, becomes, in fact, a medical treatment in these particular cases.

But there are many other functional manifestations equally under our control, directly or indirectly, besides those previously enumerated.

As we reach the paralyzed nerve through the muscles — making them the levers, as it were, to move a hidden weight—so we may reach other organs and produce other phenomena by similar means.

We may secure the most extensive voluntary sway over the whole system, and its several parts, through the influence which regulated muscular action has over the circulation of the blood. When it is reflected how large a portion of the circulating fluid is used directly under muscular contraction to nourish that tissue, it will be seen that we have in our hands a remedial means of no insignificant import.

Aside from this, what method have we for securing a proper peripheric circulation? Cold hands and feet, if they are often the effect of disease, may be also, and often are, the *cause* of serious derangements. Not only is there the depressing effects of such a state upon the nervous system, but serious internal congestions are often the result of this abnormal distribution of the circulating fluids. Besides the many cases where common exercise is impossible, but where an abnormal circulation is still the proximate cause of the derangement, there are others perfectly competent

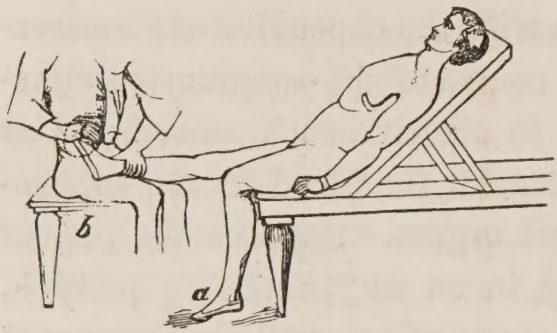
to take a certain amount of exercise, but where all they can endure not being enough to induce general reaction, does not affect relative disproportions of the circulation. And in many cases, general exercise, instead of promoting a peripheric circulation—warming the extremities and relieving internal congestions —produces just the opposite effect. The reason plainly is that, in these cases, from the small amount of available force, and the character of the exercise, the already oppressed lungs, heart, or other vital organ is obliged to labor even harder than the extremities, so that the blood flowing most toward the parts enduring most labor, forsakes the extremities and accumulates about the internal organs, thus defeating the very object aimed at. It is very true that, if the patient be sufficiently strong, and there is no actual central congestion, and the mal-distribution of circulation is only temporary, any proper exercise will be ample to secure a peripheric distribution, because there is no chronic depression of a vital organ, and no more than ordinary effort on the part of such organ in accomplishing the exercise. But every physician must have noticed, and many, no doubt, are perplexed at the fact, that gymnastics, walking, or other exercise, often produce paleness, coldness of extremities, palpitations, oppressed respiration, etc., in many cases where these very symptoms it is most desirable to prevent. It is these same cases where to secure a proper circulation in the extremities would relieve the depression of the nervous system, relieve

over-burdened central organs, and secure harmony in all the functional manifestations, and consequently cause health to supervene.

The method of securing this peripheric circulation is very easy to comprehend. As it is muscular contraction, in connection with the expenditure of innervation, that governs the course of the sanguineous circulation, we have only to contrive such movements as will cause a greater demand for blood in the extremities than in the central organs. Suppose the patient be made to sit quietly, in an easy, reclining position, where no muscular contractions will be necessary other than those of the extremities acted on. Now, if the patient be made to flex and extend the various joints of the extremities, in a slow and uniform manner, the force being increased by being resisted by an assistant, an increased capillary circulation, in the parts thus acted on, will be insured; because a physiological demand has been made for a supply of blood, to which the system is capable of responding, to the fullest extent of its resources, because this demand is not counteracted by others, made at the same time, at distant or opposite points. The sanguineous circulation is not divided or deviated from its flow toward the only points making, at that time, an extra demand for nutrition. Even entirely passive movements—that is, movements that do not engage the patient's volition —may be so applied as to afford a normal, mechanical stimulus to local capillary circulation. These ideas are made plain by the following illustrations:

Fig. 33 represents a chair, with a movable back or flap, so constructed that it may be adjusted at any angle, or laid down flat; in the latter position presenting a level, horizontal surface. It should be well cushioned with hair. Now, let the patient sit, reclining, on the soft cushion, at such an angle as is most comfortable, usually at about forty-five degrees, with the leg and foot resting on the assistant's lap, as represented in the figure. By placing the palm of the hand on the toe, and moving it around, in the circumference of a circle, such a rotation will put all the muscles and elastic tissues in the alternate stretch and relaxation, as far up as the knee. The effect will be an acceleration of the circulation, in the capillary net-work thus acted on, which is again supplied from the larger blood-vessels. Besides being exceedingly agreeable to the patient, warming the feet, and relieving the head or other congested organ, it is all accomplished without the least expenditure of nervous force on the patient's part—a matter of the utmost importance in many cases.

Fig. 33.



Rotation of foot a derivative movement.

Or, let the patient, in the same position, extend the foot very steadily and slowly against a firm resistance of the assistant, and let the assistant flex the same against the patient's resistance (see concentric and ec-

centric), and the muscles employed in stretching the foot will have been put in powerful action. The same may now be done with those that bend the foot, after which, all the muscles below the knee will have been put in the most favorable condition for causing the greatest amount of tissue-transformation, and requiring the greatest supply of plasma through the sanguineous circulation, which immediately responds and flows in that direction, because no other similar demands are made in any other. Hence the phenomena has been *localized*—like a foot-bath, in contradistinction from the general bath over the whole body—but with an incidental derivative influence upon superior organs.

In the same manner, there may be flexion and extension of the knee. The assistant slowly presses the leg down (see fig. 33) against the resistance of the patient, and the patient then extends the leg against the resistance of the assistant, bringing into powerful action the extensors of the leg. The same movement, reversing the manner of resisting, will act upon the flexor muscles of the leg. Thus it will be seen that, while a feeble patient is sitting quietly in a peculiarly comfortable position, with but a trifle of the effort required to accomplish any ordinary exercise, all the elastic and muscular tissues of the lower extremities have had to be supplied with a large amount of arterial blood, which has been derived from superior organs—perhaps congested ones—and all others, not at the same time requiring more than an ordinary amount of nutri-

tion. The same principle may be applied to every possible movement of both the upper and lower extremities, with the most powe ful and permanent derivative effects. And, for delicate cases, where there is any cause contra-indicating the employment of the next class of peripheric movements, I know of no other method which pretends to control the circulation to anything like the same extent.

But it is not always necessary, in employing movements to secure an increased circulation in the extremities, that the patient should be either wholly inactive, or active only in designated extremities, as above illustrated. Some cases can bear and require a different manner of procedure, either alone or in connection with that just described. All *general* muscular contractions *that do not accelerate the heart's action, or disturb respiration*, produce a decided centrifugal effect upon the circulation. This is especially true, *when this general contraction takes place while the limbs are extended.* The reason is obvious. Besides the tissue-metamorphoses accompanying this functional act, requiring a larger amount of the plasma of the blood to be distributed among the muscular tissues, the general *compression* of the capillary net-work mechanically drives forward the fluids into the veins, when their places must be supplied from the larger vessels and internal organs. And when the position is such that there is a gradual increase of muscular force, from center to circumference, the conditions are most favorable for such a peripheric determination of the

circulating fluids. To secure the desired result, the conditions just laid down must be rigidly adhered to, or other effects will be obtained, as will be seen as we proceed. Several examples will make these ideas sufficiently plain.

Fig. 34 is easily understood as representing a curtseying movement. The patient takes hold of a pole, about six inches above his head, his elbows being bent at about right angles. He then slowly raises on his toes, and curtsies down till his arms are straight, where he hangs a few moments, and then, slowly straightening the legs, rises into the first position again. This is repeated three to six times. To make it still more powerful, the assistant presses down upon the hips, if necessary. Such a movement requires but a slight effort, is very general in its action, and affords a good illustration of gradually increasing muscular tension toward the extremities.

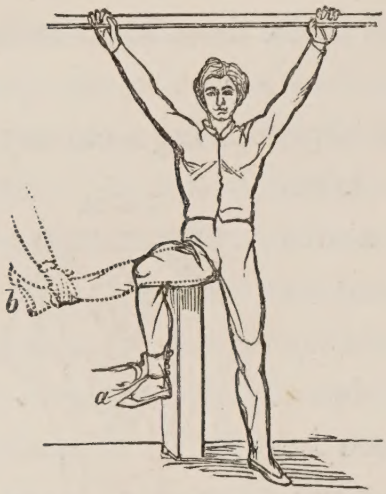
FIG. 34.

Acting on the upper and lower extremities at the same time, so as to cause a peripheric circulation.

Fig. 35 shows a less general, but useful movement, promoting a peripheric circulation, and at the same time having a definite effect of its own. The arms may be extended horizontally, stretched over the head, or as represented in the cut, according to circumstances. The hands seize the pole, one leg partially supports the body, while the thigh of the other, with the knee

bent at right angles to it, rests on a support, as represented in the cut. The patient then slowly stretches the leg (against resistance), and it is then pressed down, against the patient's resistance. This movement puts the muscular and elastic tissues, on *both sides* of the leg, in powerful action, which is extended to the glutii and the spinal muscles of the same side, as far up as the middle of the back. If the object is to treat both sides alike, the same is to be done to the other side also. This movement is often given in scoliosis. For instance, in scoliosis to the right, it would be given on the left leg. It is a derivative, peripheric, special movement, affecting principally one lower extremity, of which there is a large class, and of which only a few of the most simple and least complicated, either in idea or execution, can be introduced here.

FIG. 35.

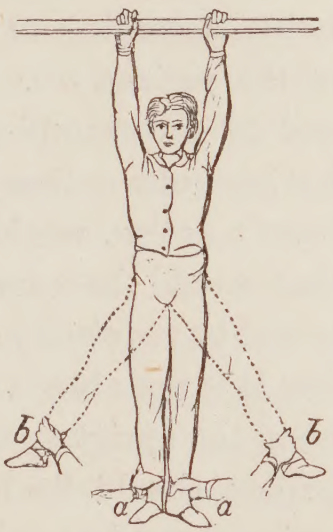


Muscular action of the extremities, but principally in one leg, and up that side of the back, promoting circulation on that side.

Fig. 36 represents a person hanging by the hands. It is easy to see that the most powerful force will be required in the hands and arms to sustain the body, and that the muscular effort must gradually diminish toward the lower extremities, coming to its minimum in the legs. Now, if the patient separate the legs, by moving them slowly from *a a* to *b b*, against strong

resistance, and they are then brought back again, from *b b* to *a a*, while the patient resists, the muscular contractions that are cumulative in the shoulders and arms are propagated along the lateral hemispheres of the body into the legs, making muscular action and compression general over the whole body, and particularly along each side of the trunk. When properly taken, the heart's action need not be disturbed, and, from the ribs being everted, and chest expanded, by the position of the arms, respiration is *relieved* and easy. This movement, when properly given, is followed by the most agreeable glow and feeling of relief and comfort over the entire surface of the body.*

Fig. 36.



Powerful movement, to secure peripheric circulation, acting principally on each side of the body.

The illustrations above given are by no means intended as those movements most commonly employed for the purpose which they simply illustrate. The particular ones to be used must be determined entirely by the indications of the case. Very often several objects are attainable, more or less perfectly, by the same movement. For instance, the movement shown in fig. 35, while promoting a peripheric circulation, especially strengthens some of those muscles that are

* In speaking of a movement, it is always meant, unless otherwise described, the same repeated *four* to *six times*, and *always* very slowly.

weakest in lateral curvature. So, also, there are often various combinations of the above described two classes of movements for securing a peripheric circulation, according to the muscular and nervous power of the patient, etc. Movements of which figs. 34, 35, and 36 are examples, though easily executed by those having quite ordinary strength, without increasing the heart's action, would be too powerful for many cases that would be capable of greater effort than what would be required in movements represented in fig. 36. But it is not always necessary that the patient should be in the upright position. Suppose, for instance, the patient should lie horizontally on his back, with an assistant pulling at his hands, and another at his feet, instead of the weight of the body in hanging, the muscular and elastic tissues would be put upon the stretch, in the ratio of the traction made, which, again, could be controlled by estimating the patient's strength; and if the same movement be made as represented in fig. 36, the effect upon the circulation, though less, would be similar to the other. (See fig. 68.) So, also, in the same lying, or any other proper position, by aid of assistants to force or resist, flexions and extensions of the arms and legs could be taken, varying in intensity according to the condition of the patient. Thus, a very great variety of movements may be contrived to suit every possible capacity or exigency, all tending to the accomplishment of a specific result. And let it be remembered, that none should be employed except such as do, from their anatomical and physiological

relations, clearly tend to produce the result which the pathological condition indicates as desirable, else harm would be done, instead of good. And, in the treatment of disease by movements, it should never be forgotten that the first and last object to be attended to *is to secure a proper distribution of the circulating fluids;* all other purposes are more or less incidental. When this is secured, in many cases, there will be no further need of medical aid; for, let me repeat, that healthy peripheric circulation implies an absence of all internal congestions, and a consequent free play of all vital activities. And in all cases, the simple stretching of the muscles while the patient is more or less in repose—in almost any position requiring only simple efforts—is one of the very best means of influencing the circulation of the blood. And this can be done to almost any patient, however feeble he may be. The relief—almost instant relief—often afforded very delicate patients, who are utterly incapable of voluntary effort, is sometimes remarkable. As the external capillaries become filled, the heart beats slower, the head is relieved, nervous irritation ceases, and a quiet comfort succeeds anxious distress. But in those cases where other pathological conditions require appropriate treatment, it must be added according to the indications. Thus, to place in contrast with the above, and to show in a clear light the principles and resources of the treatment under consideration, the treatment of various common derangements of the alimentary organs and other chronic affections will next be considered.

CHAPTER VII.

CONSTIPATION OF THE BOWELS.

CONSTIPATION seldom Cured by Physic—PATHOLOGY of Constipation—Inadequate Capillary Circulation—Eccentric Movements—Mechanical Action of Movements on the Contents of Bowels—Localized Movements—Counteracting Movements to be Avoided—Mechanical Stimulus—Vibrations of Abdomen—Stimulating Afferent Nerves—The Liver—General Directions—Results of Treatment.

How often is constipation of the bowels *really* cured by the means ordinarily employed? Cases do recover; but in what proportion of such does the physician's prescription deserve any credit for their restoration? Is not the greater portion of these cases persons who have "thrown physic to the dogs," and paid more attention to their general hygeine, especially what is embraced in diet and exercise? And yet there is not a single "ill that flesh is heir to," so common in civic life as constipation of the bowels, and one from which medical skill is so often implored for relief in vain. There are vast multitudes whose only desire—medically speaking—is to be relieved of this distressing malady; to whom, to be freed from their slavery to the pill-box or the syringe, would be bliss indeed. And yet this is neither a formidable nor dangerous disease. Why this acknowledged failure in so simple a disease? for it is admitted that a forced evacuation

of the bowels, as a general thing, is only a temporary expedient, and does *not* tend to cure the disease, but rather to increase its incorrigibility. Perhaps medical treatment is as efficacious here as in other diseases, but it is one of those rare cases where tangible results present a true index of the benefit received, leaving no chance for deception or doubt.

In the treatment of intestinal constipation, is the real pathology of this affection sufficiently taken into consideration? Constipation is too generally treated as though the disease occurred through willful neglect of the abdominal organs to perform their functions, and that coercion was the only legitimate corrective means; whereas the only truly correct treatment, in such and all similar cases, would be to increase the strength and vigor of the organs themselves, when their functions would be easily, readily, and spontaneously performed.

The proximate cause, in most cases, of their inability to evacuate their contents, is a deficiency of intestinal mucous or other fluids, debility of the non-striated muscular fibers, and consequent inadequate vermicular motions, and feeble innervation. Now, the conditions under which the glands secrete intestinal fluids — under which the non-striated muscular fibers perform their functions, and innervation takes place — is a healthful supply of arterial blood in the capillaries of those organs. That these are not well performed, implies that this proper supply is somehow cut off; besides, the appearance of the tissues themselves, as

well as the success of the treatment based on this theory, demonstrates that, in constipation, there is a condition of retraction of the tissues involved.* Exosmose has exceeded endosmose, till the cell structures and capillary net-work of the intestines have had their capacities considerably reduced, with a consequent reduction of their functional manifestations.

It has been shown that, in affections of visceral organs, the external parts are secondarily affected in the same manner as the organs beneath them. Thus, we find, in constipation of the bowels, as a general rule, the parts are hard, contracted, and unyielding, having little of that peculiar, doughy feel on manipulation so characteristic of healthy organs. The apparent exceptions to this rule only prove the rule itself, for when constipation is accompanied by a soft, flabby condition of the parts, as it often is, especially in females, it shows an atonic condition, the result of the previous state long continued, and requiring nearly the same general course of treatment. But constipation NEVER occurs while the abdomen retains its ordinary physical appearance to the touch.

From the pathology of the disease under consideration, it will be inferred that eccentric movements topically affecting the abdomen will be indicated in constipation; or, where the retraction has progressed to atony, both eccentric and concentric movements will be required. The object is to induce an *arterial*

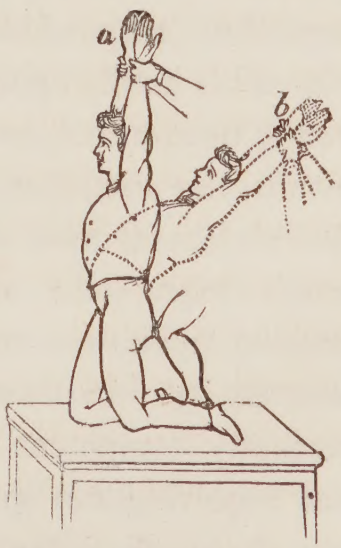
* See Retraction and Relaxation.

capillarity of the abdominal contents and muscular coverings; in other words, to build up those tissues, that their functional capacity may be increased. This is to be done by the employment of such movements as expand—draw out—those muscles and parts, against their effort to contract, and by supplying, in various ways, the *mechanical* stimulus necessary to their healthy action.

The natural stimulus to the action of the bowels, especially in sedentary persons, who are most afflicted with this disease, must be more or less mechanical agitation of the abdominal contents, because it is generally the want of a sufficient amount of such agitation which causes their torpidity.

Fig. 37 represents the patient kneeling upon a bench, with his hands stretched over his head. The assistant then places one knee on the patient's sacrum, and grasps both of his wrists with his hands. From the position of the hands, the ribs are drawn up and firmly held, making the chest a firm attachment for the abdominal muscles. Now, if the patient be drawn back, from *a* to *b*, as represented in the figure, the fulcrum of the movement will be in the abdomen, by which both muscles and contents will be most power-

FIG. 37.



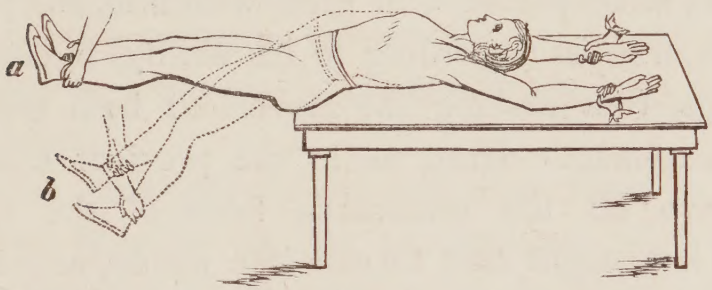
Movement for constipation—expanding anterior portion of the trunk—acting principally on the abdominal contents.

fully expanded. If it be a case of relaxation of muscles, with the pendulous belly, so common in females, the patient may now bend forward against the resistance of the assistant. Here we have a converging of all the muscular power of the system toward one point, and that point is in the abdomen. Sanguineous circulation and innervation all flow in the same direction, and the expanding of the capillaries, by the eccentric movement, is most favorable to it.

Fig. 38 represents another example of movements used in the treatment of constipation. The patient is lying upon a bench, the chest firmly fixed, by the extended position of the arms, as before, which an assistant firmly holds, and the legs, from the hips, projecting beyond the table. Of course it must take considerable force of the abdominal muscles to keep the legs thus suspended in the air. An assistant then places his hands upon the ankles, and presses both legs down, from *a* to *b*, as represented in the cut. By this means, the muscular, tendonous, and elastic tissues of the abdomen, and the abdominal contents, are very much expanded; and the latter, being somewhat pressed upon, are made to assume new positions in that cavity. In those cases where the patient is not perfectly competent to maintain this position, without requiring too great effort, or to resist the pressing down, then the assistant places one arm *under* the patient's legs, and assists him to hold them up, to make the movement in a proper, gentle, easy manner. For, I must constantly repeat that, how-

ever severe a position or movement may *seem* to be in practice, it must *never* be exhausting to the general system. It must be remembered, however, that a

FIG. 38.



Expanding anterior portion of the trunk—acting principally on the abdominal contents.

powerful contraction of a single muscle, or small group of muscles, may take place, with but slight expenditure of nervous force, if all the rest of the system be at rest; a movement that would be wholly impossible, if attempted at the same time that a similar contraction was progressing over the whole body. In this manner, the whole system, of even the most delicate persons, may be progressively subjected to isolated, powerful, muscular efforts, that would be impossible, or very harmful, if attempted altogether—as in gymnastics, calisthenics, etc.; besides, the rapidity of these latter cause a fearful and useless waste of nervous force.

But to return to the subject. It will be seen that the legs, by acting as a weight, and the assistant, by the under arm, taking off as much of that weight as he assists in holding up the legs, the power of the movement can be graduated to any degree of force, according to

circumstances. Where the retraction is well determined, the legs had better be elevated by the assistant, without any help from the patient, thus making the movement entirely eccentric; but, in recent cases, or in cases accompanied with great weakness, the patient had better assist (according to his ability) in elevating the legs, thus making the movement both eccentric and concentric. Here, as in the previous example, we have all the contractile force of the system that it is thought best to call into action, converging toward, and concentrating in the abdomen, carrying along, and, as it were, depositing there—*providing no counteracting movements be employed*—a certain amount of functional ability. These examples are only intended to illustrate one prominent idea in the treatment of intestinal constipation. Of course it could be carried out in a multitude of ways, to suit all possible conditions and cases—adapted equally to the strong man or the most delicate lady.

FIG. 39.

Trunk rotation—expansion of and motion to the abdomen, acting especially on ascending and descending colon.

Fig. 39 represents another excellent movement for constipation—a movement which, while acting expansively on the abdomen, imparts to it a wholesome kneading motion. The patient is secured to the post by a strap around the hips, where the upper part of the body is rotated upon

the hips, but the trunk always carried *back* of the perpendicular—the center of the motion being through abdomen.

In practice, great care should be taken not to disturb the circulation too much, by employing too many of the more powerful movements, for actual congestion may be produced. An *equilibrium* only is to be established.

It was previously mentioned that there is a *mechanical* stimulus to the performance of function. Every function is performed under the direct influence of *some* stimulus, or, more properly, several stimuli. Thus, light is the stimulus to seeing; sound to hearing; food to salivary and gastric secretion and digestion; volition and external impressions (reflex) to muscular motion, etc. Whatever things we are fitted to do, we must do, in order to retain the fitness to do them. Seeing begets sight, food digestion, motion, strength, etc. Whatever we are fitted by nature to endure or withstand, a certain amount of those things we must endure, or else we lose the capacity to withstand or endure them. Hence our endurances become normal stimuli to function. We endure an atmospheric pressure of about 27,460 pounds, and any considerable less than that would render life impossible.

We are capable of extracting nutrition from crude food, and are obliged to dispose of the undigestible remainder; *pure* nutrition will not support life. And so we are adapted, in the arrangement of our corporeal system, to endure and overcome certain physical

obstacles, and being thus fitted, we must encounter those obstacles in some form, or lose our capacity to overcome them. They thus become the physical or mechanical stimuli to function. The aborigines of any country, and our own Western hunters, are never troubled with constipation. The constant *motion* given to the abdominal organs, by their modes of life, supplies the necessary mechanical stimulus. The abdomen—from its situation below the chest and above the pelvis, being affected by the action of both extremities, contained in elastic walls, liable at any moment to have its space encroached upon by external objects—is adapted, by its peculiar and yielding structure, to receive a greater amount of jostling in life than any other organ. Indeed, this jostling becomes a necessity to its healthful action.

Then, when business men stand or sit at their desks; professional men in their offices; ladies at their music or embroidery, and school girls at their studies, in positions and occupations imparting almost no motion to the abdomen—much less, even, than to other parts, when they require much greater—why do we wonder that constipation is so common? One of the most important conditions, for the performance of functions, is withheld. This portion of the pathology of constipation again suggests the remedy. It is to impart *motion* to the bowels. This can not now be done at labor, or in the ordinary course of exercise—it is too late for that, as enough motion of the whole system sufficiently to affect the abdomen, in its inactive con-

dition, even if such exercises could act upon it in the right manner, would involve too large an expenditure of strength, and would cost too much. Motion must be *imparted* to the abdomen by another, and in such a manner as to answer the indications.

Fig. 40 is intended to represent a *vibration* of the abdomen. The patient lies upon his back, generally with the shoulders slightly elevated—just enough, so

FIG. 40.

Kneading and vibrating the abdomen.

that the abdominal muscles will not be drawn too tight, or so tight as to prevent the intestines from being influenced by the vibration; but these muscles should be sufficiently tense, so that, at each vibration, they will be slightly stretched, thus producing an eccentric condition in them. In some cases, where there is slight tenderness at first, for the first few times, the knees may be drawn up—as represented by the dotted lines—and held by an assistant, which position entirely relaxes the abdominal muscles. But this latter is not the most favorable position to produce the best effects in constipation. It is the true position in chronic diarrhea.

An assistant then places the palmar surface of both hands on the abdomen, and makes a succession of

sudden shakes or vibrations. This is several times repeated, with slight pauses between them. Another and very useful manipulation is done by placing the fingers of both hands on the abdomen, over the caput coli, and kneading along the course of the ascending transverse and descending colon, several times repeated, pressing the fingers deep down into the tissues. Another is to place the ulnar side of both hands in the iliac fossa, and press the abdomen, upward and inward, with a rolling motion ; or, place the hand over the pubis, and press directly up, with a vibration. This latter is often better done with the patient standing.

It should be borne in mind, that the effect of these various topical manipulations depends, in a great measure, upon the *position* of the patient while it is being performed. For instance, a vibration of the abdomen, while the parts are more or less expanded, expands the parts still more, at each jerk of the vibration, and this stretching of the fibers and capillaries is, in reality, an eccentric movement, added to the special stimulus of the motion upon the final nervous loops of the parts. The effect of a vibration upon the fully relaxed abdomen will be explained in speaking of chronic diarrhea.

We can avail ourselves still further of the influence of the nervous system, not only in securing a higher susceptibility, by the direct stimulus of muscular action on the extreme nervous loops—or "peripheric brain," as they are often called—but we can make use, also, of the phenomena of reflex nervous action.

Fig. 41 represents a "knocking" over the sacrum, from one trochanter to the other. The patient may lie with the face downward, or, as is the more usual position, standing and leaning forward, with the hands resting on a support of the proper height. A gentle knocking, with the clenched fist, over the glutti and sacrum, gives a very pleasant sensation to the parts, affecting the nerves distributed on that portion of the trunk, which stimulus is propagated along the afferent nerves to the center, and from thence along the efferent nerves distributed to the intestines. The vibration of the abdomen no doubt operates, also, somewhat in the same way. Percussion on the nates may seem a very simple, and, perhaps, to some, a frivolous procedure; but when we employ the same principle by tickling the throat to produce gastric contractions and emesis, and it is well known that irritating the mammæ will produce uterine contractions and abortions, etc., why hesitate to use so physiological a means of accomplishing an object? In my experience this simple means has often produced an immediate evacuation of the bowels.

Fig. 41.

Knocking over the sacrum.

I am satisfied that, in constipation of the bowels, the liver has much more blame imputed to it than it really deserves. The liver is generally made a scapegrace to carry the blame attending ill success in treatment. Still, it often is remiss in its duties, as well as the other

organs, and needs to be admonished. Fig. 42 represents a percussion, or, technically, a "clapping" of the liver. The patient stands firmly on his feet, with the right hand stretched up over his head, and the trunk slightly bent to the left. In this position, the muscles over the liver, on the right side, are rendered very tense, and a percussion on them will cause a vibration like beating a drum-head. The liver being suspended by its ligaments, has the vibration thus communicated to it. It is an eccentric, neuro-tonic movement, and dissipates hepatic congestions, and causes an increased secretion of bile. Indeed, I have known it to act, in a very susceptible person, as a cathartic, like calomel. But, as a general thing, we do not expect movements to bring about immediate and violent results, but a gradual return to harmonious vital manifestations. The physiology of the liver-vibration is nearly the same as that just explained in describing abdomen-vibrations. It is eccentric, and causes a greater influx of arterial blood, and the functions of the liver generally are stimulated, including the increased secretion of bile.

FIG. 42.

Percussion of the liver.

The length of time required for the treatment above described, to bring about a healthy condition of the abdominal functions, depends, of course, entirely upon

the general state of the system and the other complications; for here an alleviation of the symptoms can be only due to a certain actual gain, that from its nature must be permanent, because it arises, not from a temporary stimulus, but from increased ability of the organs to perform their functions. But simple constipation, in a person otherwise tolerably healthy, generally yields in from one to four weeks of daily treatment. Of course, the same precautions should be taken to remove all exciting causes of constipation, such as improper food, mental emotions, etc., as though any other means were employed to improve this special function.

In the treatment of this disease particularly, care must be taken not to employ too many, and especially too diversified movements at a time. Where we wish to produce a local effect, a great diversity of movements employed at the same time must produce a diversity of effects, and would more or less neutralize the peculiar local effect sought.

In the treatment of constipation, we often have beautiful illustrations of the efficacy of the localized movements. As a general thing, we do not anticipate immediate results to follow a particular course of treatment; but it often happens that the effect of a particular movement, or of a prescription of movements, does follow very soon after the treatment commences. I have had many examples of this in the treatment of constipation. Where the constipation is merely local —that is, where it exists independently of any general

cause, and where there is otherwise good health, the cure is often very rapidly effected.

A young man, otherwise in first-rate health, but engaged in an inactive employment—a cashier—has been treated for constipation on four or five different occasions. He could endure the strongest movements localized at the abdomen, as previously explained, and though this state had existed for several months, it never failed of being relieved in less than a week. Sometimes, even, one or two days' treatment was sufficient to produce healthy action of the bowels. The effect would generally last for several months, though his business and habits remained the same.

But, generally, when a patient presents himself for treatment, the disease has existed so long that it has produced more or less general debility, when, of course, the system can not so readily respond to a local impression, and a much longer time will be required to effect a cure. But even then, if tolerable constitutional vigor remain, two or three months are generally sufficient to produce a radical change in the health of the abdominal organs.

But the great beauty of the treatment is, that the relief is lasting. As the process is not one calculated to effect speedy and violent results, what results do appear must have been brought about by more general causes; and these causes, because they are general, and not the result of a temporary stimulus, must therefore be more permanent.

And such I have found to be the fact. One or two

cases will illustrate. A lady for many years (she said seven) had had such obstinate constipation of the bowels that she fully believed there was some mechanical impediment in the rectum, which examination proved not to be the case. During all this time she was obliged constantly to resort to medicine or enemas. Her health suffered greatly. After treatment for one week, the bowels began to make effort to relieve themselves, and in four weeks she was so far cured that, from that time till six months after, when she was last heard of, the alvine discharges did not cease to be natural and spontaneous.

A retired merchant, past the vigor of life, reported that for eight or ten years he had had scarcely twenty spontaneous evacuations. It was nearly two months of persevering and rather severe treatment before there was perceptible amelioration of the symptoms. Continuing the treatment one or two months longer, he left with very fair action of the bowels, and has remained a year and a half as well as when he left.

But there is no use of repeating cases the number of which might be greatly extended. The treatment is sufficiently illustrated already.

CHAPTER VIII.

CHRONIC DIARRHEA.

ITS PATHOLOGY—Opposite to Constipation—Irritability and Relaxation of the Tissues—"Irritate the Muscles"—Concentric Movements—Kneading relaxed Abdomen—Engorgements of the Liver—Dissipating Congestions—Constitutional Treatment

ACUTE diarrhea, being attended with more or less inflammation and irritation, contra-indicates the Movement-Cure treatment; but *chronic diarrhea* comes very properly within this practice. It is true that chronic diarrhea and constipation are often produced from the same cause, and in many individuals these two affections alternate one with the other. Still, the actual condition of the tissues corresponds with the apparently opposite phenomena exhibited through their action. As the organs of the lower bowels are irritable in chronic diarrhea, and are lacking in irritability in constipation, and as in the former case the vessels throw out too much fluid, and in the latter too little, so there must be a corresponding relative difference in the pathological conditions of the organs themselves. In chronic diarrhea there is a stagnation of circulation in the venous capillaries; or, more properly, perhaps, in that portion of the capillaries containing the venous blood, the serum of which passes by exosmose into the intestines, or is imperfectly, though

abundantly, secreted by the irritable intestinal glands. As constipation is accompanied by a retraction of the tissues, diarrhea, on the other hand, is characterized by the opposite or relaxed condition. The physical signs indicate this, for the parts are soft and relaxed to the touch, and there is a general correspondence with this condition in all the contiguous tissues. What, then, are the indications for treatment? They seem to be as follows:

1st. To relieve the local irritation by irritating (stimulating) the general muscular system. Ordinary exercise, when sufficient to appreciably affect the muscular system, generally *aggravates* a chronic diarrhea. The reason is obvious. The exercise, *as generally taken*, increases the previously existing general debility of the nervous system, by exhausting it out of all proportion to the *muscular* effort, and this nervous exhaustion is almost another name for irritability. Irritate or use the muscles, then—controlling the circulation, especially the peripheric, where necessary—without making draughts upon the nervous system, and the nervous irritation will subside. This is accomplished by any slow, duplicated,* eccentric, and concentric movements of such a character as the patient's general condition will admit of

* This term is used to denote *two forces*—the *patient's and assistant's*: the patient's movement being opposed by the assistant (concentric), or the patient's movement being *made* by the assistant, while the patient resists (eccentric), in distinction from free movements made by the patient alone. In this treatment, the movements are always performed with assistants—often with several.

2d. Concentric movements upon the abdomen, to correct the relaxation of the tissues, accelerate the venous circulation in the capillaries, and produce a tonic condition of the parts, are indicated in this disease. These movements will be exactly the reverse, in every respect, to those previously described for constipation, except that, in general, they ought not to be so powerful. But any bending forward of the trunk, or elevating the legs, while lying on the back with the arms by the sides, in which the abdominal muscles will be contracted against resistance, will be useful, provided they are given in easy positions, and are not fatiguing. Kneading the abdomen is of very great benefit in chronic diarrhea. When this is done, the knees should be drawn up, as represented by the dotted lines in fig. 40, and held by an assistant, and, generally, the head is a little more elevated than is there represented. The object of this position is fully to relax the abdomen, so that the parts, in any manipulation, *can not* be put on the stretch, and so that the abdominal walls and contents can be freely rolled about by the kneading. Then, very gently, and without any punching or severity, the abdomen is clasped between both hands, and rolled from side to side and upward for a few moments. After a slight pause, the motion is renewed and repeated, say six or eight times. It is well to conclude by a vibration, the same, but more gently than for constipation, as represented in fig. 38, it being done with the knees elevated, and on the relaxed abdomen, which makes the difference in the effects.

Chronic diarrhea is often attended with engorgement and sluggishness of the liver, sometimes with enlargement of that organ. For this, let the patient be seated in such a chair as is represented in fig. 33, and perfectly relaxed in all his muscles. The assistant, standing before him, lays his hands over the liver on the floating ribs, and imparts to them a succession of vibrations, which tend to disgorge that organ. A strong bending of the trunk, through the hepatic regions toward the right, also has the same effect. Any twisting movement, properly done, that would compress the liver, would also be indicated and useful. But great care must be taken not to produce congestions, by employing too many of the twisting and sidewise bending movements—only one or two of such should be employed in each prescription; but the principal movements for this disease should ordinarily be those that act on the extremities in comparatively easy positions, and kneadings and vibrations on the relaxed abdomen, liver, etc. The reason why the body should be relaxed is, that we wish to assist the venous circulation in its flow *out* of the capillaries, and the folding together, shaking, etc., which occurs from movements of the relaxed parts, compresses, in a variety of ways, the net-work of capillary vessels contained in the tissues, and propels forward the blood—it can not recede, on account of the valves—toward the general torrent of the circulation.

But in the treatment of chronic diarrhea less dependence is to be placed on the effect of the local treatment

than on the building up of the general system, equalizing the circulation, and producing a healthier state of the fluids and tissues of the whole body by appropriate movements at a distance from the affected organs.

CHAPTER IX.

DYSPEPSIA.

Its Frequency—Chasing "Symptoms" Deprecated—Forms of Dyspepsia—Chronic Gastritis—Atonic Dyspepsia—Constitutional Causes—Treatment—Peripheric Circulation—Rule—Acting on the Stomach—Atonic Dyspepsia—Treatment—Localized Movements.

It is probable that the physician is more frequently consulted with regard to some of the many forms of this disease, than for all others that pertain to civilized life. And this will continue to be the case until the people of civilized nations have many of their habits of life—especially their sedentary and dietetic habits—radically changed for the better. To mention all the complications, and enumerate all the symptoms of dyspepsia that are every day poured into the physician's ears, would require a good-sized volume; but it is not necessary in a work like this, which pre-supposes the reader to be already acquainted with the characteristics of disease in every form. Given the disease, how shall it be treated?

The object of this work is simply to point out general principles, as viewed from the physiological standpoint which the Movement-Cure occupies, in those cases where it is applicable, rather than to present formulas and prescriptions.

And, speaking of symptoms, leads me to remark, that probably in no disease is the practitioner so frequently led away, in his treatment, on a will-o'-the-wisp chase after "symptoms," to annihilate them, as in dyspepsia. He chases acidity with alkalies, constipation with laxatives; guesses the liver is to blame, and gives blue-pill. Now he is after "eructations;" anon it is "water-brash;" this time one "bad feeling" must have its remedy, next time another; till both physician and patient are forced to give up the chase from sheer exhaustion. And yet it is admitted that diet and general hygeine are the only reliable means of cure.

The symptoms together with the history of the case are necessary to make out the diagnosis, after which the disease should be treated on general principles—the usual, unpleasant symptoms being *effects* that must be *borne*, rather than conditions requiring constantly to be interfered with. And this is the general experience of dyspeptic patients and of physicians.

Simple dyspepsia, in all its varieties, may be reduced to two general classes, embracing pretty well-defined lines of demarkation.

First. We have what nosologists denominate "chronic gastritis." This condition is characterized by "more or less thirst; a dry skin; scanty and deep-colored urine; a red tongue, red especially at its tips and edges, patchy and fissured, perhaps, or smooth and glossy, like a piece of raw beef. The throat is also frequently tender, and the pharynx and palate unnatur-

ally vascular."* There is, also, generally, tenderness in the hypochondriac and epigastric regions. A voracious appetite, and much distress during digestion, often accompany this disease.

In the *second* place, we have what may be called "atonic dyspepsia"—not implying that the first is *sthenic*, for *it*, also, is atonic in its nature, though accompanied by more active symptoms. In the atonic variety (sometimes called "nervous" dyspepsia, as the first is often called "mucous" dyspepsia) there is comparatively little local disturbance. Indeed, in some cases, the patient is not aware of the nature of his disease, and while he eats and drinks nearly as usual, though failing to receive adequate strength from his food, yet he can scarcely be made to believe he is troubled with indigestion. Generally, however, the patient finds no difficulty—by a variety of annoying symptoms, principally of a nervous character—in determining the seat of his disease. There is great prostration; the tongue is relaxed, of light color, showing the points of the teeth on the edges, and tremulous on protruding it; the appetite is variable, generally not very craving before eating, but is not appeased by food—the patient often eating much more than he at first intended; digestion not often attended with actual pain, but slow, and yielding little strength to the frame. These distinctions in the pathology of dyspepsia are well founded, and require to be recognized in the treatment.

Chronic gastritis, contrary to what its name implies,

* Watson.

is really a disease of debility, the same as strumous ophthalmia is a disease of debility of another kind, or as atonic dyspepsia; only the former is characterized by a debility of the *vessels*, while the latter is characterized by the same condition of the *nerves* and *muscles*. In chronic gastritis there is venous congestion of the capillaries of the stomach, attended with turgescence and irritability of that organ. Dyspepsia is nearly always a constitutional disease, of which the so-called chronic gastritis is only an important symptom. But a faulty nutrition neither begins nor ends in the stomach. The essentially constitutional character of dyspepsia is illustrated by affections of the mucous membrane of the pharynx and larynx, in "minister's sore throat," in catarrhs, uterine congestions and diseases, etc., which likewise result from constitutional causes. Even when the dyspepsia is brought on by improper habits of living, it is altogether probable that the constitution suffers before the gastric troubles manifest themselves. Indeed, such improper dietetic habits do not always cause disturbance of the organs immediately concerned in digestion, but beget other and far different diseases.

In the treatment of dyspepsia, of course, the first thing to do is to correct the habits—especially the dietetic habits—of the individual; and this should be done by insisting on general principles, rather than the giving of specific rules. Having done this, what are the indications of treatment in that form called chronic gastritis?

In this form of the disease, accompanying the gastric irritation and congestion, there is always great and most persistent coldness of the extremities, especially the lower extremities, which often remain blanched after the most persevering efforts to warm them. And does not the well-known fact that the gastric derangement is always in the inverse ratio of the circulation in the extremities, indicate the first step in the treatment of this disease? The first step, then, is to secure a peripheric circulation. All the principles laid down in treating of circulation are applicable here. At the same time, while the same means that secure a peripheric circulation will relieve the gastric congestion, the interstitial processes, consequent on the muscular motions, promote a more healthful quality of the nutrient fluids, and in the same measure allay irritation and chronic inflammation.

The principles heretofore laid down for securing a peripheric circulation must be strictly adhered to, but the manner of applying them must vary according to the peculiarities of each case. Great care should be taken that the patient be not fatigued by any of the movements given him. It is a peculiarity of this disease, that very frequently no amount of free, voluntary exercise, which the patient's strength allows him to take, is capable of thoroughly "warming up" the surface and extremities of the body. In other cases, however, where there is yet considerable muscular and nervous strength, the most distressing symptoms often are *immediately* relieved on the breaking out of a

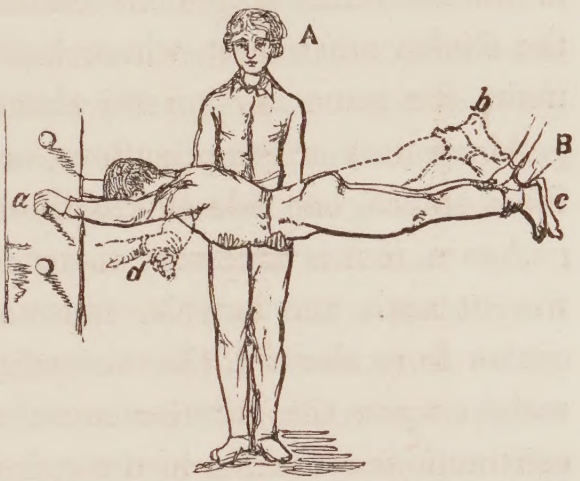
gentle perspiration, consequent on taking exercise. Sitting before a fire, or taking a warm bath—both of which secures a better peripheric circulation—will generally give the same temporary relief.

In undoubted cases of chronic gastritis, accompanied by pretty severe gastric symptoms, such as tenderness at the pit of the stomach, etc., *there should be few movements given by which the trunk is bent through the center*, till after the extremities have been vigorously acted on. Even when conjoined with constipation, great care should be taken that the movements intended to benefit the constipation do not aggravate the affection of the stomach. In such cases, it would be better to wait till the gastric symptoms are relieved, before treatment is specially directed to the constipation. It is probable, however, that in that case the constipation would, in most cases, yield with the dyspepsia, from general causes, without special topical treatment.

After an equilibrium has been partially established in the circulation of the nutrient fluids, by some days or weeks of proper treatment to that end, then such movements may be given as combine a general action on the circulation and a local stimulus to the stomach. Fig. 43 is an illustrative one. The patient takes hold of the pins, each side of a post, at a convenient height, with the body suspended horizontally—one assistant (B) holding and making traction at the feet; another (A), with both hands under the patient's abdomen, determines the force of the strain at that point—that is,

the extent of the fulcrum over the stomach—for the weight of the body causes it to bend at that point—by the amount of assistance he gives in sustaining the patient. The remaining in that position causes a general compression of the peripheric capillaries, particularly along the *anterior* surface of the body, accumulating in force in the region of the stomach—a force that can be nicely proportioned by the amount of assistance given by assistant A. The position itself, from the stretched position of the patient, acts principally eccentrically on the tissues, and causes a genial warmth to pervade the whole, especially the anterior surface of the body. At the same time, the stomach is gently compressed, in a proper manner to stimulate its functions without causing irritation. But if, in this position, the legs be separated, after the manner represented in fig. 37, the same quiet but persistent action of the muscular tissue is propagated along the patient's sides, and *increased* in the anterior surface.

FIG. 43



Movement for dyspepsia—affecting the general circulation and stimulating the stomach.

Or, if it be desirable to make the movement still more powerful, and at the same time act principally on one lateral half of the body, assistant B may hold by only one leg, while a third assistant makes a move-

ment from *c* to *b*, in the direction of the dotted lines; the same may be done with the arm. On which side of the body this single movement (in distinction from the *double* movement, where both arms and both legs make the same movement) should be made, will depend upon other complications, as the condition of the liver, spleen, one side of the chest, etc.

Again, if it is necessary to act more powerfully upon the stomach and bowels, assistant A may cease altogether to render aid, thus throwing the patient's whole weight upon the anterior muscles of the trunk, with contractions centering in the epigastrium. This movement is exceedingly agreeable, and, with plenty of assistants, may be given to the most delicate.

But it is not necessary, in order to carry out the principle here illustrated, to always employ this particular movement. There are a variety of ways by which the same idea can be approximately carried out in practice. For instance, if the patient, standing erect, grasp a pole as high as he can reach over his head, and then have his hips gently pressed forward, keeping the knees and arms stiff and resisting, the anterior half of the body and the upper and lower extremities will be acted upon. But in the commencement of treatment, in the form of dyspepsia under consideration, the principal indication is to relieve the nervous depression and the gastric congestion and irritability, through equalizing the general circulation, after which the same means may be employed that are useful in atonic dyspepsia.

In atonic dyspepsia, the indications are to invigorate the whole system generally, and the digestive organs especially. There is a deficient quantity and poor quality of blood, but there is no marked gastric congestion. There is little ability to resist cold, which is more probably the cause of the cold extremities than the relative want of circulation in them. In atonic dyspepsia, the patient, if he suffers less pain, is yet more unvaryingly miserable. There is great debility of the nervous system—so much so that every movement is attended by an exhaustive effect, from which the individual is a long time in recovering. This debility extends to the mental-nervous system, producing, in many cases, hypochondriasis, with its miseries.

The system needs nutrition—strength. The nervous energies may be increased, by acting through the muscular, in such a manner as not to exhaust the former. The movement illustrated by fig. 33, and the explanatory remarks, are applicable here. Let the patient *be acted upon*—there should be many passive movements given—flexions, extensions, rotations, etc., of the upper and lower extremities, while in a half-lying position (fig. 33), or in any manner by which we can irritate the muscles with little effort on the patient's part. At the same time, mechanical stimuli can be applied, locally, with great benefit.

FIG. 44.

Vibration through the middle of the trunk—accelerating the digestive process.

Fig. 44 represents the patient sitting (passive), while one assistant, standing behind, places a hand on each side over the short ribs, and another, standing before, places his hands over those of the first assistant; then, unitedly, a rapid vibration is imparted to the patient's sides. A general "shaking up" of the liver, spleen, and that portion of the viscera in the hypochondriac regions is the consequence.

Fig. 45 represents a method of acting still more directly upon the stomach. The patient sits, with the left leg drawn up, and the right arm extended over his head. The position is such, that by the tenseness of the right side, and the relaxing of the left side, the stomach is thrown far to the left. Now, if a hand be placed upon, or just below the floating ribs, as represented in the figure, by pressing upward and inward, with a vibratory motion, we impart the same to the stomach at the large extremity. A perceptible increase in the quantity of the secretion of gastric fluid will be the result. Another very good method of acting directly on the stomach is this: Let the patient lie, as represented in fig. 40, with the legs at the dotted lines, while the assistant passes the ulnar edge of the hand across the abdomen, just under the diaphragm, and, with a sort of kneading motion, presses

Fig. 45.

Vibrating the large extremity of the stomach—stimulating the secretion of gastric fluid.

directly down upon the stomach. These manipulations are exceedingly agreeable to the patient, and he always arises from them with a great feeling of comfort and satisfaction. In all these movements great care should be taken to give them not too violently. A gentle movement of the proper kind is much more curative than a harsh one.

Another movement, combining more purposes than the foregoing, is shown in fig. 46. It consists of a rotation of the middle of the trunk, while the feet and hands remain fixed in their places, as shown in the figure. The patient takes hold of a pole, just above his head, in such a manner that when the arms are not flexed, the trunk must be bent in the middle. The assistant then grasps him by the loins and whirls him around the circumference of a circle, indicated by the dotted lines, the only flexion being through the loins—forward, backward, and from side to side—the patient's face remaining in the same direction. This movement, while it gives a great deal of motion to the abdominal contents, and much exercise to all the muscles of all portions of the central part of the body, at the same time, from the contractions of the muscles of the upper and lower extremities, a very

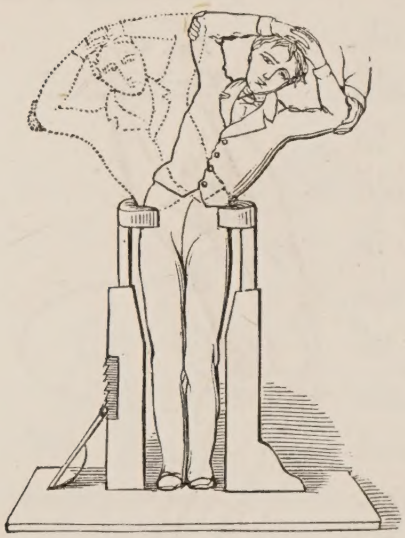
FIG. 46.

Rotation of the middle of the trunk — promoting a peripheric circulation and causing a rolling or kneading of the stomach in one movement.

good general peripheric circulation is established. It is useful in all derangements of the digestive organs. It would be too powerful for weak cases, especially in the beginning of the treatment.

Another very excellent movement for giving a natural motion to the abdominal contents is shown in fig. 47. For this movement, the instrument which is represented in fig. 22 is used. The circular pads are made to embrace the hips, which they hold very firmly, while the patient's trunk is bent from side to side—alternately stretching the loins and pressing upon each side of the abdomen, thus arousing to activity particularly the liver and spleen. This movement may be varied by bending forward and backward, or by rotation of the trunk.

FIG. 47.



Movement for indigestion — acting on the stomach, liver, and spleen by sideways bending of the trunk.

These movements, united, if the patient is very weak, with passive pullings or stretchings of the muscles, or more active ones if the patient be stronger, will be found sufficient, if persevered in, to relieve almost any case of ordinary dyspepsia or indigestion.

But this relief must not be expected to follow as speedily as if it were from the operation of a medicine. The treatment is simply an equalizing, reparative process, seeking to build up the system to

such a state of perfect health that the unfavorable symptoms will gradually disappear. And such a gradual re-establishment of the health is the usual result of the treatment in all cases retaining sufficient constitutional vigor to be developed. Nevertheless, though a radical cure may not be expected without persevering efforts, still temporary relief is often found in a comparatively short period, and the same process needs only to be continued a sufficient length of time to render it permanent.

CHAPTER X.

PULMONARY CONSUMPTION.

Movement-Cure not Exclusive—Tubercle the product of Imperfect Nutrition Nutrition and Digestion—Interchange between the Blood and Tissues and Blood and Oxygen—The Use of the Muscles—Nervous Debility and Irritability—Exhausting Exercise Injurious—Treatment—Pulmonary Circulation and Peripheric Circulation—Expanding the Chest—Stiffness of the Muscles over Diseased Portions of the Lungs—Dr. Corson's Paper at the Academy—Developing the Stiffened Muscles—Its Influence on the Lung beneath—Illustrated Localized Movements and Explanations—Dissipating Pulmonary Venous Stagnations—Chest Vibrations—Prescriptions of Movements—Effect of Muscular Contraction on the Lymphatics—Increased Oxydation in Consumption Denied—Deficient Oxydation the true Pathology—Relief obtainable by Treatment.

It is not necessary, in a merely suggestive work, like this, to enter into discussions of the chemical or microscopical nature of tubercle, or even to mention the more prominent symptoms attending phthisis pulmonalis in its various stages, for these are fully and clearly set forth in the various modern works with which every physician is supposed to be familiar; but it is sufficient to consider the relations of the *general pathology* of this disease to *physiology*, in its bearings on the treatment under consideration. Neither is it necessary to consider any of the various modes of treatment that have been and are now advocated by different members of the profession, for I take up the subject where they all leave it, carrying it beyond art into nature; adding, it is to be hoped, a certain amount to any and all other means that may be employed to

stay the ravages of a disease that carries off one fifth part of the human race.

In its relations to physiology, the Movement-Cure is a perfect system, so far as it goes, within itself, and need not be mystified by connecting it with other subjects. To show its advantages, in any case, does not cause it to militate against or detract from the merits of other systems of treatment, but it comes in as an auxiliary, and still further utilizes other legitimate means of cure. The Movement-Cure adds to, but takes nothing from, legitimate medicine.

At the present day, the profession are pretty much agreed—and the treatment adopted is in accordance with this general agreement—that the essence of consumption lies in a faulty nutrition, a condition of the whole system of which the pulmonary tubercular exudations are only a symptom; a faulty nutrition depending upon an imperfect plasma, and a low organizing power in cell-formations. Dr. John Hughes Bennett, Sir James Clark, and others have noticed that in phthisis pulmonalis the digestive functions are deranged; and every one knows that the lungs, infiltrated with tubercles, are incapable of admitting the proper amount of air to secure the necessary purification of the blood. But, after both these highly important considerations have been attended to, what are still the indications? What is yet necessary to render available proper food and digestion and plenty of air and respiration?

Nutrition neither begins nor ends in the stomach

or lungs. The processes in these organs are necessary, but still *preparatory* steps to nutrition, which takes place in the *tissues*. Dr. Bennett says: "In the first place, nutrition itself is more connected with proper exercise, and breathing fresh air, than many people imagine; it does not merely consist in stimulating the appetite and giving good things to eat. It requires, first, food in proper quantity and quality; second, proper digestion; third, healthy formation of blood; fourth, a certain exchange between the external air on the one hand, and between the blood and the tissues on the other; and fifth, it requires that there should be proper excretion—that is, separation of what has performed its allotted function and become useless. *All* these processes are necessary for nutrition, and not one or more of them, for they are all essentially connected with and dependent on one another. The means of preventing not only pulmonary tuberculosis, but tuberculosis in general, therefore, consists in carrying out those hygienic regulations which secure these different nutritive acts. The most important of these, undoubtedly, is attention to climate, exercise, and diet."*

Hence it appears that the accessories of food and air to proper nutrition may be present, and still partially unavailing, until we can secure these interstitial changes which are necessary to the elaboration of healthy tissues; and, until this is done, the preparatory steps—digestion, respiration, and even sanguinification

* "Pathology and Treatment of Pulmonary Tuberculosis," p. 68.

—being controlled as to quantity and quality by the demands proceeding from the nutrition in the tissues, must take place imperfectly, in the ratio of the imperfect tissue-metamorphosis. How can there be proper digestion while the materials of nutrition, passed into the blood, can not be employed in tissue-making? and how can there be a normal introduction of oxygen by respiration, when there is less than a normal exchange between the tissues and the blood, thus lowering the affinity of the blood for oxygen? How, then, shall the system be placed in the most favorable condition for proper tissue-transformation to take place, instead of the faulty manner connected with the disease under consideration?

One of the most important indications is to produce tissue-transformation (nutrition) by using the muscles. Hence, exercise has always been highly recommended in this disease, and often even unsystematic exercise is attended by the best results. But simply to "exercise" may neither improve the strength nor health; it *may* injure both. Weakness, as well as strength, may result from the employment of any function. We see in our streets, every day, both men and animals made weak, and even diseased, by too much exercise, as well as by improper kinds. How much more likely is this to be the case in a diseased condition? And right here is where much harm is too often unadvisedly done to consumptive patients, by injudicious advice—or, rather, unguarded advice — to them to "take exercise." "Certainly," says the emaciated young man, with the

thin fingers, pale cheek, and hollow eye; he who had been behind the counter for ten years, without a good run in all this time; "certainly, I need more muscle—I must have exercise." So he makes the—for him—hazardous experiment. Without having had any directions given him—as is too often the case—he walks, rides, saws wood, swings dumb-bells, and tires himself out as often as he can, thinking that he is therefore getting useful exercise. What is the result? His feeble muscles act feebly, but require a great effort; the congested lungs are congested still more by the hurried respiration, and the rapid beating of the heart is increased to a gallop by the extraordinary effort. He gets very little muscular contraction, but a fearful waste of nervous power, and an increase of all the worst symptoms, and dies six months sooner than he ought to have done.

In consumption there is great debility and consequent irritability of the nervous system, and this condition is one cause of the imperfect general nutrition—and it happens that the exercises ordinarily taken are such as produce fatigue and exhaustion in the nervous system, out of all proportion to its effect upon the muscles; thus leaving the system in a condition where it is incapable of being profited by the organization of tissue of a higher vitality than that broken down by the exercise. The *general* indication, then, will be met by employing the muscles in such a manner that, while *they* are made to act with more or less force, no greater demands shall be made upon the

nervous system than can be easily and healthfully responded to.

There are a variety of *special* indications that can be answered with great physiological exactness by this treatment. *The first thing to be attended to, and never to be lost sight of for a moment*, is the circulation of the blood. Feebleness of the heart's action, imperfect respiration, poor quality and small quantity of the blood, and especially want of proper affinity between the blood and the tissues, all conspire to produce the livid countenance, cold extremities, and consequent pectoral congestion and oppression so characteristic of pulmonary consumption.

If the reader has carefully noted all that has been said on the subject of controlling the circulation (so often alluded to), he will be prepared to understand the principle to be applied in selecting movements for the treatment of consumption. We should act almost wholly and very perseveringly on the extremities, by rotations of the feet, hands, arms, and legs, and by flexions and extensions of the same, after the manner previously described, *but there should* NEVER *be any attempts to expand the chest till after the peripheric circulation has been much improved.* And, during the whole course of the treatment, the securing and maintaining of a healthy peripheric circulation should never, for a moment, be lost sight of. Indeed, in almost any chronic derangement of the system, when we have secured a proper distribution of the circulating fluids, we have only to maintain this condition, and simply

wait for the improved health which is sure to follow. In practice it is generally best to begin and end a prescription with movements having more or less reference to this indication, with two or three movements for special purposes in the middle of the prescription. Insisting again on the importance of the foregoing, I pass on to illustrate more specific treatment in this disease.

The substance of what was said under the title of "retraction and relaxation," occurring in tissues over diseased organs, was first published in August, 1858. These views have been strikingly confirmed by a paper read by Dr. J. W. Corson, at the session of the Academy of Medicine, held on December 1st and 11th, on "Management of the Shoulders in Examinations of the Chest," and reported in the *American Medical Monthly*, for January, 1858.

I quote: "He had also an interesting and really useful sign to communicate, which had hitherto escaped notice. It was comparative *stiffness* in the movement of the shoulder *over the lung most diseased*, on short breathing, as watched carefully behind. For this he gave the *sixth* 'position.' It was to face the back of the patient, a yard distant, near a window or white wall, and let him drop his arms, 'as if dead,' by his side, and breathe deeply, 'like a man a little out of breath.' The physician first 'takes aim,' like a rifleman, across the tips of the shoulders, and then draws nearer and watches the play of the 'inferior angles of the scapulæ in breathing, with a movement like the fins of a fish.'

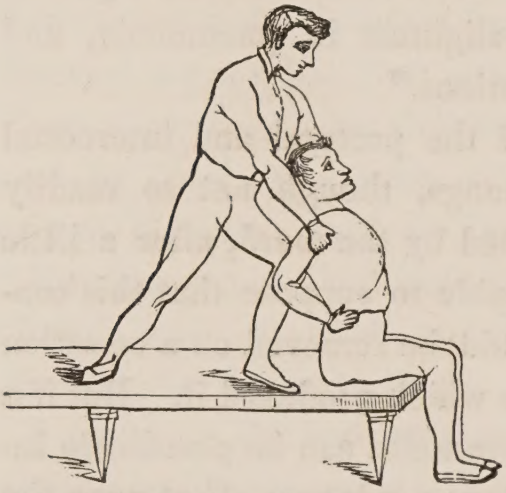
The *paralysis* might be either mainly 'acromical' or 'angular.' Curiously enough, this seemed to depend on the higher or lower location of the disease which *thus paralyzed the parts nearest.* A very elegant way of testing 'angular stiffness,' especially in a fully-clad lady, was to place the two index-fingers as 'pointers,' lightly on the lower ends of the shoulder-blades, and watch their motion as she sighs. This stiffness was less in recent attacks. It varied most in *different stages* of phthisis, was slightest in pneumonia, and greatest in pleuritic affections."

The same condition of the pectoral and intercostal muscles over diseased lungs, though not so readily *seen*, can be easily detected by the *touch*, after a little experience. It is reasonable to suppose that this condition of the muscles would be removed on a cessation of the pulmonary disease which produced it. But if a healthy condition of the muscles can be *previously* induced, why may it not have a salutary effect upon the disease in the lungs? I believe it does have this effect, and experience and analogy sustain this view. This rigidity of the respiratory muscles must impede respiration, even beyond what it would be impeded from the simple condition of the lungs, at the same time contracting the thoracic cavity. Now, if we can remove this rigid, partially paralyzed condition of the respiratory muscles we have gained a great point, independently of the fact that while doing it we also expand the chest and actually increase the aerating surface of the lungs themselves.

But this localized action upon the respiratory muscles can not be had by any ordinary exercise, because, as explained in discussing paralysis, a voluntary motion is always done by the muscles which can do it most easily, viz.: the unaffected and the strongest ones. Besides, the engagement of the whole body in any action precludes special effects on particular parts.

Fig. 48 represents how the chest may be expanded, the ribs everted, the thoracic capacity increased, and the anterior respiratory muscles stretched, in very delicate cases, even where it is not proper for the patient to make any voluntary effort. The assistant places one knee between the shoulders (protected by a cushion), then placing his hands in each axilla, gently draws up the shoulders and chest by the pectorales, major, minor, and subclavii muscles, at the same time pressing forward gently with the knee, the patient, meantime, remaining perfectly passive. This may be repeated six or eight times, and is invariably followed by a feeling of great relief to the patient. The pectorales, major and minor, subclavii and intercostales, have been put upon the stretch (eccentric movement), the capacity of the chest enlarged, respiration relieved, and the partial paralysis of the respiratory muscles some-

FIG. 48.



"Passive" expansion of the chest anteriorly.

what ameliorated. In this disease forward flexions of the trunk should be avoided as much as possible.

Fig. 49 represents a more active movement. The assistant stands behind the patient, and then, leaning forward, takes hold of his hands, and, rising into the upright position again, stretches the patient's arms against the latter's resistance. The muscles of the entire upper extremities are put into action, the scapulæ are rolled outward and slid upward, the stiffened scapular muscles are thoroughly stretched, and the chest expanded laterally. After the assistant has made as strong traction upon the patient's extended arm for a moment as the case will bear, the patient draws them gently down again against resistance. Thus a most powerful action of the muscles of the superior portions of the trunk has been obtained with slight expenditure of the nervous force.

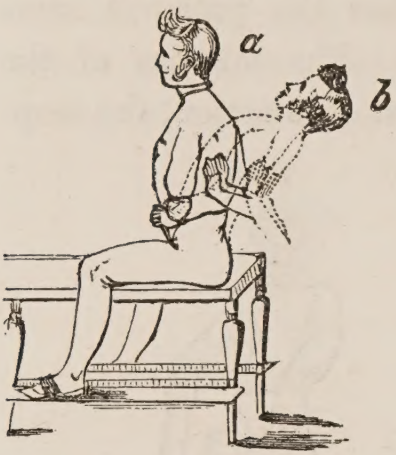
FIG. 49.

Drawing up the arms, expanding the chest laterally, and promoting circulation in the upper extremities.

Fig. 50 represents a movement that gives more immediate comfort and satisfaction to the patient than, perhaps, any other. It shows the patient sitting astride a bench, with the feet resting on a support, and fixed in the stirrups, as seen in the cut. The position is

such, that the lower part of the person is quite firmly fixed. The patient's hands rest on his hips. The assistant now places his hands just under the shoulder-blades, longitudinally, each side of the spine, and the patient bends backward, principally with the *upper* part of the trunk, bending it slightly *over* the hands, thus held (but not too firmly) against the back. Thus the patient's chest is expanded by *his own* effort; the posterior muscles contracting, and the anterior ones expanding, in counteraction to the sunken chest and protruding shoulders these subjects generally exhibit. To make it still more powerful, the arms may be crossed over the head. After the patient—relaxing a little—has been pushed back to his first position, the movement should be repeated several times, very gently and slowly.

FIG. 50.



Backward flexion of the upper part of the trunk—acting on the posterior muscles, and expanding the chest.

Fig. 51 illustrates a compound movement that accomplishes several purposes at the same time. The patient stands between two poles, the hands holding, and the elbows resting against them, the latter being at the height of the shoulders. The assistant then places his hands against the patient's back, and pushes him forward with some force, the patient at the same time rising on his toes, but not bending his knees or

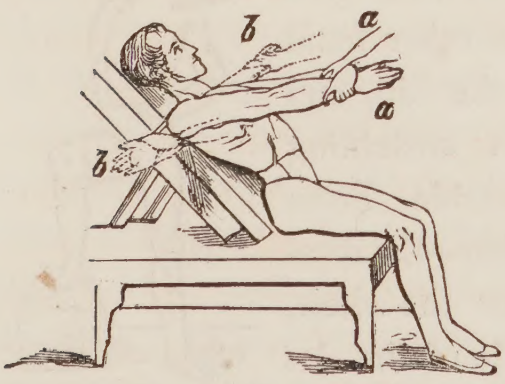
hips. The chest is expanded, both *longitudinally* and *laterally*, and the whole anterior surface of the body is made eccentric, while there are powerful contractions in the arms and legs. The chest is expanded, and a general peripheric circulation is secured at the same time. The patient settles back into his original position, and the movement is repeated a sufficient number of times. It is very excellent when properly given; but care must be taken not to use too much force with feeble patients, though it can be adapted to the strength of the most delicate.

FIG. 51.

The whole body engaged in expanding the chest, promoting general circulation, and relieving pulmonary congestions.

Fig. 52 shows the manner of developing the scapular and pectoral muscles, and expanding the chest when it is not desirable to act on a larger number of muscles at the same time. The patient is partly reclining (half lying), with the arms extended forward, when they are brought back, from *a a* to *b b*, by the assistant, to act upon the pectorales, and by the patient, when it is desired to act upon the scapular muscles. The elbows

FIG. 52.



Acting upon the anterior or posterior muscles that move the arm—to develop respiratory muscles.

should be kept stiff. Much can be done, by variations of this simple movement, toward developing those respiratory muscles that are concerned in any of the movements of the arm and shoulder—a development utterly impossible in ordinary exercise; for, in the easy, sustained position of the patient, while all other muscles are at rest, he is able to make an effort of much greater force than if a part—perhaps the greater part—of his force were expended on other muscles, acting at the same time. Besides, a *local* effect is secured.

Twisting the upper part of the chest, in certain positions, is an excellent method of assisting the development of the respiratory apparatus.

Fig. 53 (A and B) represents a very excellent method of accomplishing this twisting. One foot (as the left) rests on a stool, and the arm of the same side is stretched over the head; the other hand rests on the hip, and assists in sustaining that (right) side. From the position—the muscles below the chest, on the side of the elevated arm, being relaxed by the position of the leg—the same side of the chest is lifted up and

Fig. 53—A.

Twisting of the trunk—expanding one half of the chest.

Fig. 53—B.

Twisting of the trunk—expanding one half of the chest.

expanded. Now, if the patient's left arm, at the wrist, be grasped by an assistant, and the opposite shoulder be pressed upon, the patient can be twisted back, as shown at B; and if he then twist the left shoulder forward, to the position represented at A, all the muscles concerned in twisting the trunk will be acting in concert to expand that side of the chest. The assistant may now pull the left side back to the position at B, and so repeat several times, the patient and the assistant alternately resisting. To make the effect uniform in both sides of the chest, the same should be repeated on the other side—that is, with the right foot supported and the right arm stretched up. But, if one side is more contracted than the other, it may be given to expand that side only. It is likewise very proper to give any of the previously described movements upon only one side, when there is unequal development of the chest. There are many of these twisting movements, more or less powerful than the foregoing, that may be given, but the physician must prescribe them according to the requirements of each case, regarding *all* the pathological conditions presenting themselves.

The above are a few examples of how the shrunken, hardened muscles of the chest can be developed, separately or in groups, in accordance with their condition; the chest expanded, gently or severely, as the case demands; respiration relieved, and the wholesome physiological reaction of a more healthy respiratory apparatus upon the organs of respiration themselves secured.

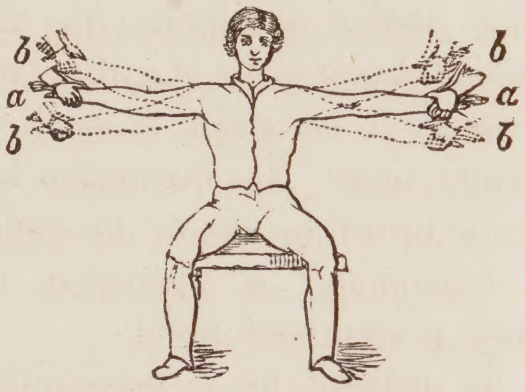
But in actual tubercular infiltration, this is not enough. There are masses of tubercle to be absorbed, if possible; and, also, there are quantities of pus, and mucus, and effusions of various kinds, filling the air-cells and impeding respiration, and causing capillary stagnation in the blood-vessels. To relieve the lungs of this mass of foreign matters which literally load them down, and make occasion for increased progress of the disease, nothing can compare to *vibrations* of the chest. Nature sets the example by establishing a cough; let art come to her aid.

For very weak cases, these vibrations should be given with corresponding carefulness. Let the patient sit in a chair, like that represented in fig. 33, and, while perfectly passive, let the assistant place his hands on each side of his chest, just below the axilla, and give ten or twelve gentle but quick shakes or vibrations; then, after a short pause, repeat them as before. This gives great relief to the sense of constriction across the chest, promotes expectoration, and relieves the cough. It should be frequently repeated, unlike most other movements, during the day.

Another and more powerful vibration is well shown by the next cut, fig. 54. The patient sits erect, or he may stand, with the arms extended on each side horizontally. An assistant, on each side, grasps each a hand at the wrist, and then, both at the same time, and with the same motion, bring the arms up and down, with a very rapid jerking, vibrating motion, twenty or thirty times repeated. The vibrations from each side are

propagated along the arm into the chest, where they meet, and are broken into very fine waves. At the same time, blood is thrown into the arm, as in swinging them. The effect is agreeable, and almost any patient can take it, for it can be made gentle or severe at will. Slight traction should be made at each hand during the shaking.

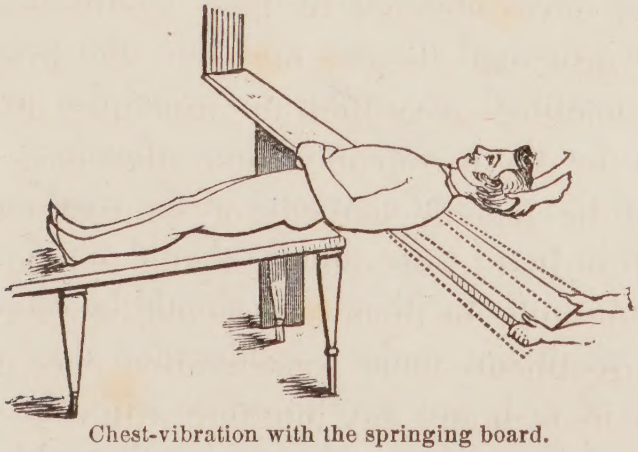
Fig. 54.



Vibrating the chest by the arms, to dissipate pulmonary congestions.

Fig. 55 represents another method of chest-vibration, and, perhaps, a more effective one than either of the preceding. A board, about ten feet long and one foot

Fig. 55.



Chest-vibration with the springing board.

wide, has one end fastened to the wall, and two or three feet from there it rests across a support. The patient lies with the lower part of the body on a bench of the same height, and with the chest resting on the long

part of the board, toward the end; the head is supported by the hands of an assistant. Another assistant then shakes or vibrates the free end of the board, which, being made of springy material—spruce is best—sends a succession of small vibrations into the patient's chest. The instrument is hung on hinges, so as to be turned up against the wall when not in use.

"Clapping," or percussion, over the chest is also very pleasant and useful.

In making up a prescription for a consumptive patient, not only the pulmonary disease, the contracted chest, and the imperfect circulation must be taken into consideration, but all other derangements and symptoms must be attended to. For instance, as previously stated, there are generally more or less dyspeptic symptoms; and often, especially in the last stages, troublesome chronic diarrhea. Now, the treatment must have reference to these conditions, as well as to the principal disease, and thus the prescription must be modified according to principles previously laid down for the treatment of those affections. I have illustrated the general character of the treatment to be employed in these cases, but it should not be considered as a formula for them. It should be remembered that the treatment under consideration does not take the place of, or in any way interfere with, the ordinary exercises of the patient; if anything, it enables him to take more than without it. It is not necessary here to urge the necessity of plenty of out-door exercise—such as he can bear—riding, pleasant society, good food, and

other hygienic measures—for the profession has come to regard these as of more importance than all other means. Even when the patient is too feeble to employ out-door exercise, the being in and breathing the fresh *circulating* air is of great importance.

A consumptive patient, under a carefully prescribed and administered treatment by movements, exhibits, to an observing physician, some interesting phenomena. The rapid, wiry pulse gradually falls and becomes more soft and natural. Patients with a pulse at one hundred before the treatment began, will be found to have it at ninety, or even less, at the end of the hour. As the treatment continues, the hands and feet grow warmer; and as the strength increases, the night-sweats gradually disappear. They experience no sudden changes, but, in a few weeks, they find themselves decidedly better; can take more exercise, and with less fatigue; sleep and eat better, are more hopeful, and, in all respects, are much improved—even those cases that ultimately succumb to the disease. But very many cases, taken in the early stages, may entirely recover. One case, in particular, is too interesting not to be introduced even here, where cases are avoided when possible, as taking up too much room. A lady had been confined to her bed for several months when the treatment began. There was excessive coughing and expectoration, a good deal of bleeding, profuse night-sweats, etc. There was a large cavity under the left clavicle in front, extending down beneath the lower angle of the shoulder-blade, and

the whole lung was involved in the disease. An attempt was made to warm the hands and feet by stretching the muscles of the extremities. The treatment was so far successful, that her hands, as she expressed it, "looked as red as a washerwoman's," and were habitually warm; the cough decreased, the night-sweats ceased, her strength gained so that she would walk several miles at a time. She remained in this comfortable condition for several years. During this time the disease continued in about the same condition as at first, though it proved fatal at *last*. This is a fair sample of many other cases. Taken in time, life may often be indefinitely prolonged.

There is one consideration that, it seems to me, should have some weight, in accounting for the benefit derived from this treatment in this disease, and especially in what is ordinarily denominated scrofula. The lymphatics have no central organ to propel their contents forward, like the heart, but depend entirely on capillary attraction, especially that force in the tissues behind them, the result of affinities exercised there, throwing a certain amount of waste into the lymphatic vessels, and the pressure of muscular contraction upon these vessels propelling along their contents. Now, any cause that lessens the affinity between the blood and the tissues, and that lessens the tonic condition of the muscular fiber, must cause more or less stagnation in the lymphatic vessels, which is the condition in scrofula. And, of course, any treatment that tends to restore this affinity between the blood and the tissues, and

produces a tonic condition in the contractile tissue, *must* have a good effect upon consumption and other scrofulous affections.

I am aware that consumption is considered, by many, to be a condition of *increased* oxydation of the tissues, and treatement is resorted to to *prevent* this alleged increased oxydation. For instance, the good effects of cod-liver oil are accounted for, by supposing that it prevents the destruction of the tissues, by supplying other material for the support of animal heat, etc. But this view ignores the fact that *too little* oxygen enters the system through the diseased lungs; that the patient is always benefited by open air and exercise, which bring more oxygen into the system and increase oxydation; that the blood itself is pale for the want of oxygen; and the assertion of Lehmann, which has never been controverted, that "*there is no disease characterized by too great oxydation of the blood.*" I believe that consumption is principally characterized by *deficient* oxydation of the tissues, and that the benefit to be derived from exercise in general, and the treatment under consideration in particular, depends, in an important degree, upon the facilitation of transformation of tissue, and the introduction of oxygen, to be used in making tissue of a higher vitality.

CHAPTER XI.

ANGULAR CURVATURE OF THE SPINE.

Its Cause—Absorption of Vertebræ—Constitutional Treatment—Hygienic Agencies—The Use of Supporters—The Formation of the Curvature—Increased Pressure at the Point of Disease—Action of Spinal Muscles—Assisting the Muscles by Apparatus—Points to Consider—The "Spinal Assistant"—Its Superiority over Other Instruments—The Principle of its Construction—Alternate Action and Rest of the Muscles—Freedom of Motion—When Aid is Useful—Special Movements—Results.

The angular curvature of the spine or "Pott's Disease"—radically different from lateral curvature, which is entirely caused by unequal action of the muscles—is of strumous origin, and is caused by actual disease of some portion of the spinal column. The disease consists of caries, or ulcerative absorption of some of the vertebræ, or the inter-vertebral substance, and, like "hip-disease," is generally a local manifestation of a disease essentially constitutional. This ulcerative absorption in the bodies of the vertebræ, or between them at their surfaces, causes an actual loss of substance at the point of disease, in the anterior portion of the spinal column, and a consequent breaking down of the spinal column, and a backward projection of the spinous processes in that part of the spine, and hence the curvature appears.

These cases require constitutional treatment, and the

Movement-Cure is only auxiliary to other judicious medical and hygienic means; but *as* an auxiliary, its aid can not well be dispensed with in seeking the best results. Whatever the constitutional treatment which may be adopted, it will not render the treatment under consideration any the less important, as answering several indications not reached by other means. My own view is, that medicines should be used only for temporary, special purposes, and should not be continued for any great length of time; but that the main dependence should be placed on good food, pure, fresh air, and a plenty of it, warm sunshine, and such other hygienic agencies as good nursing implies.

This, with the mechanical treatment for the spine itself, to be presently set forth, would seem to be all that can be done for these unfortunate cases. And unfortunate they truly are; for, with the best of treatment, there may remain, in many cases, some deformity.

With reference to the spinal column, the first question is, Shall it be supported or not?

Notwithstanding the great variety of instruments which have been recommended, there is still a diversity of opinion, among physicians, as to the propriety of using *any* mechanical support in this disease; and some of the most experienced surgeons do not hesitate to declare that, all things considered, they prefer to take the chances without any instrumental assistance whatever. They find that while, theoretically, the operation of many instruments is correct, yet the results of their

use do not answer their expectations. The reason is—and the remark applies to many other instruments besides those for the spine—that an instrument may be mechanically correct, yet physiologically injurious. That is, it might straighten a crooked stick, or other inanimate substance, but, to be worn and endured by a *living* organism, especially a diseased one, would be only to injure it.

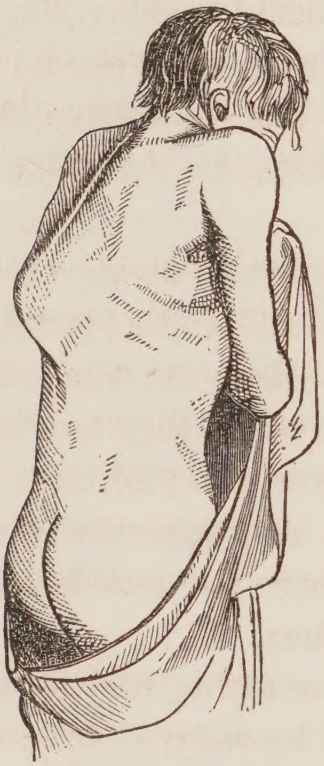
Yet even the employment of the poorest apparatus will sometimes be followed by good results, and this encourages a perseverance in their use.

The reason is this: In every case of angular curvature there is a time when anchylosis takes place; now if, at this time, *any* instrument be employed capable of lessening the curvature, and resolution and anchylosis take place before the health is impaired by the confinement of the instrument, and the consequent absence of hygienic conditions, the patient may recover, and the instrument will get the credit of it. But the majority of these cases are destined, with the best of treatment, to continue to require support for months, and often for years; and no means are admissible, whether confinement to the bed in the "prone" or any other position, or the wearing of hard, heavy, confining, annoying instruments, which can at all interfere with the general health. But it often happens that, in endeavors to secure mechanical results, the general physiological bearing of the means employed is lost sight of. An instrument, no more than any other remedial means, should be employed, except

to secure some clearly defined physiological as well as a mechanical purpose.

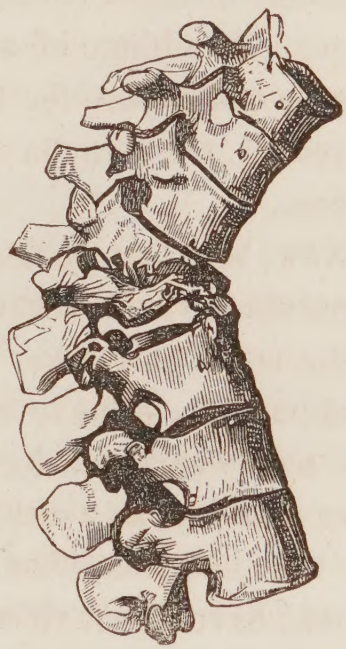
Figs. 56 and 57* represent a case of angular curvature of the spine, as it appeared during life, and a section of the spinal column, prepared after death, showing the diseased vertebræ.

FIG. 56.



Angular curvature of the spine.

FIG. 57.



Section of the same after death, showing the destruction of portions of the diseased vertebræ, causing the curvature at the point of disease.

By a glance at these cuts, no one can fail to understand the process by which the curvature, following the disease, took place. The loss of a portion of bodies of the vertebræ caused that portion of the spine above the point of disease to fall forward, the spinal muscles,

* From "Miller's Surgery."

from the increased strain to which they are subjected, being inadequate to hold it longer in the upright position. The muscles and strong ligaments binding the vertebræ together, hold them like a hinge, and the two portions of the spinal column act like levers to immeasurably increase the pressure at the fulcrum, which at the same time is the point of the disease. Thus the diseased surfaces are pinched together, like a finger in the hinge of a door. Hence, there can be no clearer indication for treatment than to relieve this increased pressure on the vertebræ, at the point of disease.

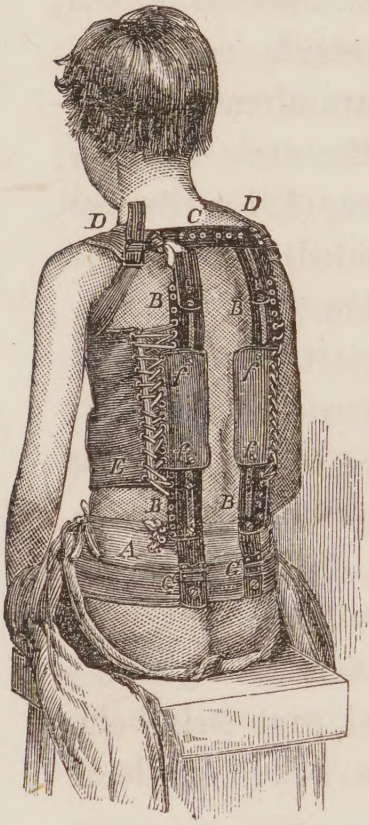
Now, the best fitting, most perfectly acting of all apparatus to sustain the spine and relieve this pressure is the spinal muscles. In health these are ample for that purpose. But in angular curvature they are tired out and weakened by acting over the projection as over a pulley, at a disadvantage. Any apparatus, then, for this affection, should not ignore the muscles, but should have direct reference to them.

Instead of being prevented from acting, they should be assisted—that is, they should be relieved from all *extra* strain, but still allowed to act as much as they can without over-doing. Indeed, the services of the spinal muscles, either in a mechanical or hygienic point of view, can not be safely dispensed with.

Thus our treatment of the angular curvature should embrace the following points: (1) To relieve the pressure at the point of disease; (2) to *assist* the overworked muscles in sustaining the spine; and (3) thus

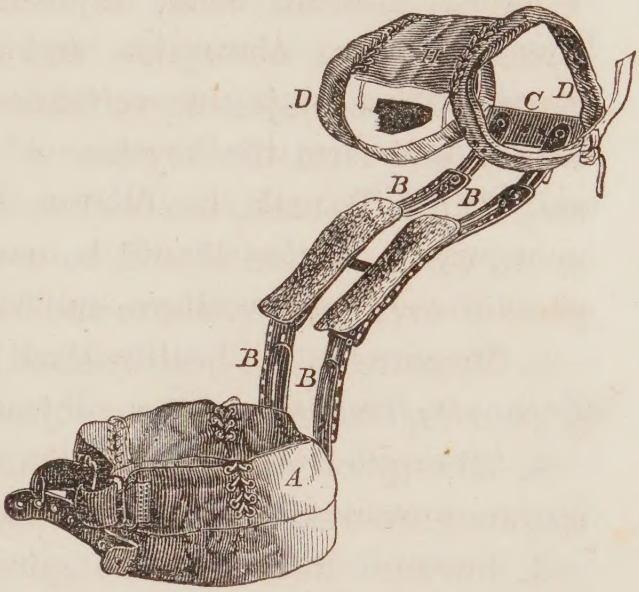
to prevent constitutional irritation and put the parts in a condition for resolution to take place.

FIG. 58.



"Spinal assistant" — applied —A, band around the hips; B B B B, uprights each side of spine; C, cross-piece; D D, shoulder straps; E, band around the trunk—this is often dispensed with; f f f f G G, hinges; at f f f f are seen screws which open (or shut) the hinges and increase (or diminish) the pressure. The spinal muscles when acting—bend the trunk backward; but forward flexion is prevented.

FIG. 59.



"Spinal assistant"—front view, showing it bent backward. A, band around the hips; B B B B, nprights; C, cross-piece; D, shoulder straps; H, strap uniting shoulder straps in front.

Figs. 58 and 59 represent an attempt to carry out the preceding view, in the construction of an instrument which I have named the "Spinal Assistant."

The most important points in the construction and use of the instrument may be concisely stated as follows:

1. Two strips pass up the back, *each side* of the spine, embracing it, as it were, which, with the band (*E*) around the

body, prevent any lateral bending through the point of disease.

2. There is *no* pressure on the projecting (diseased) vertebræ, pressure being injurious, because: *First*, Pressure causes absorption and retards resolution; *Second*, These projecting vertebræ are already wedge-shaped, and form the keystone of the arch or curve; and, *Third*, To make the fulcrum *here* (at the diseased point, where motion should be avoided), makes it the *pivot* of every motion above and below; but,

3. Pressure on the healthy fixed parts at the *angles of the ribs*, has none of these objections; also,

4. Absorption and degeneration of the *spinal muscles* are prevented by not subjecting them to pressure.

5. Forward flexion of the spine, through the diseased portion of the vertebræ, is utterly prevented, though the *whole* trunk can readily bend; but,

6. *Backward* flexion is encouraged, each strip being provided with *three joints*, hinged so as to bend backward, but not forward.

7. The spinal muscles, being thus made to act, become developed, and thus the muscles themselves aid in reducing the curvature, and become a most efficient part of the apparatus, not only during the progress of the disease, but as soon as resolution and anchylosis take place; no further artificial aid will be necessary.

8. This more healthful development of the spinal muscles contiguous to the diseased portion of the spine, favors resolution, and,

9. No motions of the body, except the forward

bending through the diseased portion, are prevented; there is no confinement of any muscles, and, consequently, the most perfect hygiene can be preserved.

Here it will be observed that, while the mechanical action is such as to relieve pressure on the diseased surfaces of the vertebræ, the spinal muscles are allowed to act as freely and as fully as without the instrument, and under much more favorable conditions for development, by being relieved of all danger of over-work. There is no *constant* pressure of the instrument, because the patient instinctively attempts to straighten himself as much as possible; and the moment the slightest effort is made, the instrument yields through its hinges, and the patient is wholly relieved of its pressure. Indeed, it may be said that the patient has TWO instruments—the natural muscles and their artificial aids; and these—the muscles and the instrument—act alternately. Thus, when the muscles act, the patient is relieved of the instrument; and when the muscles begin to relax, the instrument instantly begins to hold the spine erect. And this is just what we observe in practice.

It would be interesting to relate cases treated in the manner above set forth, but space forbids, except to say that the results of treatment are satisfactory.

One feature of this method is, that the patient can not only run about without danger, but is even protected from injury to the spine.

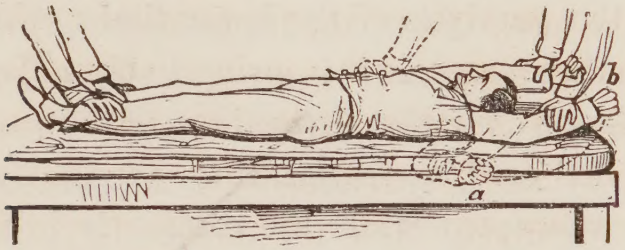
The constitutional irritation, and even hectic, caused by the active disease in the bodies of the vertebræ—

aggravated and accelerated by the pressing together of the diseased surfaces—has, in several instances, been relieved in a very few days, almost as if by magic.

It is evident that when anchylosis has once taken place, no mechanical aid can be of any use, the support being then supplied by the consolidated spine itself, the same as in health, only in a curved, instead of the natural erect position. But it is during the stage of ulceration and absorption, and while the spine is yet flexible, that a cure or amelioration is possible. We have to depend much on nature, but we may by proper means aid to a more favorable termination, what we may not have power to prevent or to absolutely cure. But, when taken in time, I believe all cases, which are not destined to succumb to the disease, may recover, always with much reduced and often with very little deformity. At least such has been my experience. With reference to the special movements which it is proper to use in such cases, they will depend much on the constitutional disturbance; but in general, the child protected by the instrument should be allowed to run about pretty much as it pleases, when it is inclined to do so. It should be recollected, however, that the instrument causing as it usually does a constant, or at least a periodical effort of the patient to straighten the back—which is a peculiar and important feature of its action—is itself giving the patient just the movement indicated. Very few other movements will be found necessary, and what

are used should have reference to the securing of general strength and a good circulation. Violent exercises, such as swinging by the hands, as is often

Fig. 60.



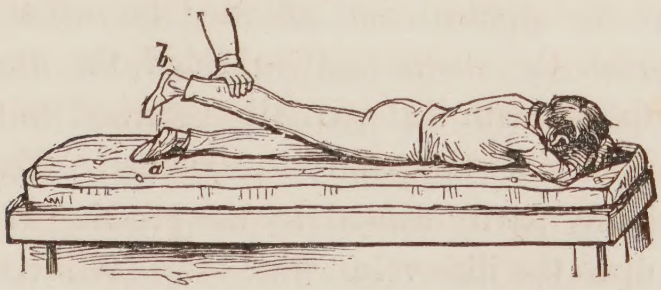
Stretching the muscles of the arms and legs.

recommended, should not be allowed, but some gentle stretchings of the muscles will be useful, such as is shown in Fig. 59.

Another movement, represented in Fig. 60, is to be recommended for strengthening the back. The patient, lying on the face, raises the leg and holds it elevated a short time; or he may move it slowly up and down for six or eight times.

As before stated, these cases require much time and

Fig. 61.



Raising the leg to develop the spinal muscles and straighten the spine.

patience to conduct to a favorable termination. But the amount of disease which they will often survive, and afterward live to enjoy tolerable health, is some-

times remarkable. In a large majority of cases, I believe, with the treatment here proposed, the result, both with regard to the deformity and the general health, will be very satisfactory.

As to the paralysis of the lower limbs, which often occurs in these cases, as it is owing to the inflammation of the diseased vertebræ extending to the membranes of the spinal cord, no treatment for the paralysis alone need be attempted while the disease is in its active stage; but the paralysis will pass off even without special treatment after the subsidence of the inflammation. But this process may be hastened by relieving the pressure on the diseased vertebræ, and strengthening the muscles by the use of the spinal assistant. In one remarkable case, the disease and destruction of vertebræ had produced the following conditions: There was paralysis of the lower extremities; they were cold and edematous nearly to bursting, dark with unreturned venous blood and broken out in numerous sores, each discharging a thin, sanious fluid. The instrument was applied, and afforded immediate relief. In one week the edema had subsided, the ulcers had healed, the warmth had partially returned to the feet and legs, and only the paralysis remained. The edema was probably partly caused by the pressing of the intestines upon the iliac veins, which were relieved by the straightening of the back after the application of the instrument.

CHAPTER XII.

DEFORMITIES OF THE LIMBS.

RESULT OF HIP DISEASE—Securing Mobility of the Hip Joint—Accelerating the Growth of the Legs—Flexion at the Hip—Mode of Extension—RETRACTED MUSCLES—Relaxation of their Antagonists—Eccentric and Concentric Movements—Appliances for Extension—General Application of the Treatment in the arrest of Development and Deformities.

THERE are many deformities, of various characters, that are curable or capable of amelioration by the Movement-Cure. All affections of the muscles, as contractions arising from inflammations and injuries, are very much relieved by being statedly and systematically brought into proper action. Stiffness of the joints, the results of injuries or disease, can be more or less overcome. Take, for example, the *results* of morbus-coxarius. There is, probably, dislocation at the hip-joint, thickening and stiffening of the ligaments, and more or less immobility of the joint; and what is still more unfortunate in these cases is, that the shock of the disease, combined with the inability of using the limb during the inflammatory stage, has arrested its growth, so that while the destruction and dislocation at the head of the bone have shortened the thigh, the difference in the length of the two legs thus produced, continues to increase, as the growth of the one takes place more rapidly than the other.

In such a case the indications for treatment are plainly as follows: To accelerate the growth of the lame leg, by creating a better circulation and development in it, by localized movements, and to relax the indurated tissues about the previously diseased joint. This relaxation and increased motion may be secured by the persevering and skillful employment of passive rotations, bendings, and "workings" of the joint, while the tissues are passive and relaxed. And the muscles may be developed by bringing them into proper action.

Care must be taken at first not to be too violent; but by putting the contracted and thickened tissues upon the alternate stretch and relaxation, they will gradually yield, till, in most cases, a very fair mobility can be secured.

The growth of the lame leg may be greatly accelerated, and it may be made even to keep pace with the other, so that the difference already existing may not increase, as is usually the case, with the natural growth of the body. In case there is flexion at the hip, it will require a persevering use of eccentric movements to overcome it. And, in some long-standing cases, it will be found useful to employ a very simple contrivance for extending it (continuous eccentric movement). To do this, attach a cord to a buckskin gaiter on the foot, the cord thence passing over a pulley, at the foot of the bed, and a weight attached at the end. This, worn during the night, keeps the leg extended at the hip, and aids very much in overcoming the contractions.

The weight need not be too heavy (say two or three pounds), but it should be persevered in for a long time.

Flexions at the knee and ankle, to develop the muscles of the leg, should be employed. A very good method of extending the thigh at the hip is to let the patient rest on the pelvis and chest, between two benches, so that the weight of the body will act upon the contractions about the hip-joint. It would be better still if the patient, resting in the same position as before, had under his chest and abdomen a board, resting one end on the bench under his chest, and then secured by a strap passing around the hips. This simple contrivance would concentrate the bearing-down force of the weight of the body at the hips, and thus extend the thigh. I have had good success in the treatment of these cases.

Contracted muscles, as in wry neck and various other affections, are expanded and relieved by the eccentric movements. But at the same time concentric movements should be employed for their antagonists. In all these cases an immediate cure must not be expected, but, by perseverance, the most satisfactory results are often witnessed. The persistent daily stretching of a contracted muscle induces a better arterial circulation in it, and finally an expansion and development of its volume.

But the antagonists of retracted muscles must not be overlooked; for it sometimes happens that it is the relaxation of certain muscles which has been the occasion of retraction in others. At least, we always find

that, where retraction of one set of muscles has existed for some length of time, their antagonists, by having been kept on an unnatural stretch, have lost most of their contractile force, and are really partially paralyzed thereby.

It becomes necessary, therefore, in treating cases of retracted muscles, to pay attention not only to those muscles, but to their expanded and feeble antagonists also.

It is often necessary to adopt various mechanical contrivances for keeping the retracted muscles on the stretch for a considerable time at once, not only as a species of continuous movement for themselves, but also to allow the expanded muscles to settle back to their natural position. But such appliances should be ingeniously contrived, and nicely adapted to each case. They should not be employed too long at a time. Such contrivances at best can only be auxiliaries, and should never be wholly relied on to effect a cure.

In all cases of deformity where there is any arrest of development, much relief can be given by persevering efforts in the right direction. But these cases are so various (scarcely ever two alike) that few specific directions can be given. The necessary manipulative skill can only be learned by practice and experience.

CHAPTER XIII.

CHRONIC INJURIES TO THE FOOT AND ANKLE.

Repeated Sprains — Weakness — Retarded Venous Circulation—Aggravated by Slight Causes—Exercise and Rest—Treatment—Dissipating Venous Congestions —Passive and Concentric Movements—Mode of Treatment—Arab Doctors— "Natural Bone-Setters"—Injury to the Nerve—Tight Shoes.

THERE is a class of cases coming under this head, of so much interest that I deem it best to make it the subject of a separate chapter.

A person "sprains his ankle." The injury is not very serious at first, so that in a week or two he is about nearly as well as ever. Still there generally remains a perceptible weakness about the ankle or foot, but not enough to attract much attention. In a few months, or perhaps not till after several years, a similar accident happens again. This time there is more swelling, and it is a longer time in getting well. But it does apparently get well in three or four weeks, and no more is thought of it. But after some months the accident happens once more, and so it continues to happen, till finally the slightest cause will produce the usual condition of swelling and lameness. And so this process goes on, year after year, till finally the patient is incapacitated from getting about, and is often confined for long periods to the house or room.

What is the pathology of these cases? It is undoubtedly this: In consequence of the original injury, the parts were left in a weakened condition, and especially with a retarded *venous* circulation. This condition was kept up by using the limb before it had fairly recovered its muscular tone, so that it was more exposed to injury from any slight mishap; and this liability increased till the slightest causes would produce the old trouble. Why it is that so much lameness may sometimes be produced from so slight causes, may be explained in this way: From a little misstep, the weak and irritable muscles may act with undue violence, and sometimes even spasmodically, with the effect of throwing an extraordinary amount of arterial blood into the foot. This is the natural result of any unusual muscular contraction; but in the cases under consideration there is already an unnatural weakness of the *venous* capillaries, so that the results which follow any undue muscular effort resemble in no way the original sprain or partial dislocation, but the capillaries are surcharged with an amount of venous blood which they are unable to dispose of. The absence of inflammation, the swollen, dark-blue appearance of the foot, the ill-success of anti-inflammatory treatment, and the ameliorating effect of tonic treatment and rest, show this to be the true condition.

Now as to the treatment. There is a state of venous stagnation. Voluntary muscular efforts, as before seen, are liable at any moment to inject the tissues with more blood than the venous capillaries can carry away,

and thus create another exacerbation of the affection. Rest would bring amelioration by allowing the vessels to disgorge themselves, but would add no real strength to the vessels or tissues. But great benefit may be derived from the use of passive rotations and concentric movements; such movements as propel along the venous circulation without increasing the arterial. (See Concentric Movements.)

The treatment may be done something in this way: Let the patient sit in an easy position, then take the affected foot in the lap (fig. 33), being sure before attempting any manipulations that it is perfectly passive. Then almost any passive bendings, twistings, rotations, squeezings, or any other means which would act on the capillaries through the muscles, or by external agencies without voluntary contractions, would influence almost entirely the *venous* circulation. So, also, concentric movements, disassociated from executive contractions (see executive and concentric), would act exclusively on the venous blood. The treatment should be conducted on these principles. In several long-standing cases the results in my hands have been very satisfactory. Of course, if so much injury has been done to the foot, as many years of periodic lameness would imply, perfect restoration may not be expected; but comfortable getting about to those for years precluded from it, is a boon to be thankful for.

I might relate several cases occurring in my own practice, but one which has come under my observation is equally in point. An eminent gentleman,

traveling in the East, sprained his ankle, and had suffered terribly from it for several months. At last, other means failing, he was induced to call in the aid of an old Arab, who promised to effect a cure. The gentleman was made to lie on the floor while the Arab, taking his foot in his hands, manipulated it for a long time. At last he was told to get up and walk off, and to his astonishment he could do so without the least pain. The affection did not return for several months. Similar cases are often related by Eastern travelers.

There is a class of empirics, styling themselves "natural bone-setters," who make a good deal of money and some reputation out of cases similar to those under consideration. The "natural gift of bone-setting" is, of course, a delusion, but these people do often possess some skill which I am frank to accord them. By various devices—such as the use of hot herbs, etc.—they contrive to allay the irritation of the parts, relax the tissues, and, especially, they get the patient into a quiet, non-apprehensive state, and then proceed to "set his bones." The real state of the case is that the patient quietly submits to a passive manipulation of the affected limb which ordinarily he would be afraid to submit to. The effect of such a treatment (done in the gentle, skillful way which it is) upon an old injury, is sometimes almost marvelous. I have had several cases of chronic injury, which were so painful that the slightest movement was not voluntarily attempted, but which would become less painful with almost every movement made in the manner above indicated. I think

it can all be explained on the principle of dissipating venous congestions.

There is another class of cases where the nerve seems to be injured, generally from wearing a too tight shoe. In recent cases of such I have had some success; but when the affection has lasted for some time, and the nerve has evidently become involved in a sub-inflammation, or, perhaps, also a congestion, the treatment has been able to afford very little relief. The most of these cases are the result of taking long walks while wearing tight shoes.

CHAPTER XIV.

DISEASES INCIDENT TO WOMEN.

Necessity for Improved Treatment—Constitutional Origin of Uterine Diseases—Attending Symptoms not always of Uterine Origin—Spontaneous Recovery—Predisposing Causes—American Women—Why disposed to Uterine Diseases—Boarding-Schools—"Taking Exercise"—Stimulating the Nervous System—School Over-work—Softness of Muscles—Muscular Relaxation—Depression of Chest and Abdomen—First Indication of Treatment—Imperfect Circulation—Cold Extremities—Second Indication—Healthful Blood—Third Indication—Common Exercise—Why not Sufficient—Rule for employing Muscular Action in these Diseases—The Nervous System—First Class—Suppression of Menstruation—Its Treatment—Second Class—Symptoms—Constitutional Treatment—Voluntary Exercise insufficient—How the Muscles may be Strengthened—Weakness of Back, Chest, and Abdomen—How to overcome it—Third Class—Prolapsus, Indurations, etc.—Treatment—Stretching the Muscles—Contiguous Development—"Spinal Irritation"—Back-ache—Its Muscular Origin—Amelioration of Incurable Prolapsus—Conclusions, etc.

A discussion directed toward ascertaining those forms of chronic disease in which the treatment by localized movements ought to be remedial, could not be complete without the introduction of the subject of this chapter. Still, it requires some degree of courage, and a willingness to encounter the charge of temerity, to attempt to put forth any new views on the subject of the diseases of women. Notwithstanding all that has been written by men who are justly considered as authority on whatever subject they discuss, and with a full appreciation of the advance which our knowledge of these diseases has made in the last few years, as the result of the brilliant discoveries following the perfection of the means of physical diagnosis; and though

great improvement has been made in the treatment of these diseases, yet is it not true that the sanguine expectations of the first advocates of topical medication, in uterine disease, have not been borne out by the experience of the profession? Who dares, at this day, to risk his reputation by introducing a new supporter or pessary? Or if some such improvement is made, how quietly and diffidently it is introduced to the notice of the profession, compared with the confidence of a few years ago! And even the caustic has ceased to be the physician's talisman, since so large a proportion of patients, once "cured," in a few months return, to his extreme disgust, as bad as before. Or, perhaps, the same case may grace half-a-dozen case-books, of as many physicians, till at last, falling into the hands of a charlatan, it actually does recover by the aid of *time* and the wholesome hygiene previously insisted on by the legitimate practitioner; but the quack takes the credit.

But has the subject of the diseases of women been exhausted? Is there nothing further that can be said on the subject? Instances are occurring in every neighborhood where women have had all the symptoms of uterine disease—leucorrhea, bearing-down sensations, the characteristic back-ache—who have recovered from all these symptoms without any treatment. Others have recovered after the ordinary treatment had failed to give more than temporary relief. This is not to say that the treatment ordinarily employed (I mean caustics, supporters, and other similar topical

treatment) is never useful—for that would be contrary to the fact—but that it is *not always* useful, or even so generally useful as was formerly supposed; and still further, that while well calculated to give temporary relief, it is not competent, in many cases, to insure a *radical* cure, because it does not reach the constitutional condition which constantly tends to produce the disease, during and after the topical treatment, as before. Hence the constant liability to the recurrence of the disease. A radical cure, when it occurs in these cases, is brought about most frequently as the effects of *time*. Or, if we would hasten the time and increase the chances of a radical cure, we must look to some constitutional treatment that shall eradicate or decrease the tendency to the production of uterine disease.

And here I come to my first and fundamental proposition, which is this, viz.: *In the majority of cases, prolapsus, versions, hypertrophies, and induration, ulceration, and irregular menstruation, are local symptoms of a constitutional condition.*

They may or may not require topical treatment according to the character and extent of the local manifestation; but a radical cure can only be expected (except as it often *accidentally* occurs) through such *general* treatment as the indications of the case require. I may be here met with the apparently triumphant citation of those cases of imperfect involution of the uterus following parturition, as conclusively establishing the purely uterine origin of all the long train of symptoms which subsequently appear. But that is

just the case, the pathology of which proves the constitutional origin of the local trouble, with the symptoms flowing therefrom. The question recurs, Why was the involution of the uterus imperfectly performed? Was it because of a mere local incapacity, with a perfectly healthful condition of the general system? In most cases, excepting accidents, evidently not. There must have been some disturbance of the circulation and the general nutrition—perhaps, indeed, owing to the shock of parturition, but which would make it none the less constitutional—which prevented a perfect involution of the uterus. If a wound heals badly, we do not suspect the trouble to exist in the wound itself, but in an unfavorable state of the constitution which prevents healthful resolution from taking place. There seems to be no reason why the same reasoning will not apply to imperfect involution of the uterus after parturition. But even if this were not the case, it generally has become constitutional before treatment is applied, and should be treated as such.

Another reason for believing that in so many cases the uterine trouble is merely the local manifestation of a general constitutional condition, is the patent fact that all the most distressing symptoms may be present in cases where there is neither displacement, hypertrophy, nor ulceration; though, where they do exist, they no doubt greatly aggravate the existing symptoms. It is too often taken for granted, however, that where there are certain symptoms, which are frequently found

in connection with disease of the uterus, that they must necessarily arise from such disease; and if searching investigation discovers the slightest deviation from a perfectly normal condition in that organ—so slight, indeed, that it would not be heeded in any other organ—the innocent uterus is too often subjected to some routine treatment; with what success the true pathology might suggest.

It is true that a certain number of cases do recover under treatment; but when we witness others which apparently recover without treatment, and take into consideration, also, the necessary hygiene that has been enforced—the rest, and, equally important, the *time* that has elapsed, for all diseases have their limit—it may justly be doubted how much the *local* treatment has had to do with the *permanent* recovery. Let it be understood that it is freely admitted that there are cases of the ordinary uterine derangements of the class indicated above, where the common method of treatment does afford present relief, and often is of permanent benefit; but I believe that these cases are much fewer than is generally supposed; and that even in these cases the constitutional treatment to be proposed in this chapter would not only aid in the speediness, but in the permanence, of the cure.

The local disease, individually considered, throws but little light on the constitutional states favoring its existence. We must examine the general conditions of classes and communities, and see if we can not there discover some condition of constitution favoring the

existence of some form of uterine disease, either organic or functional, in a large proportion of the women of this country, where these diseases are notoriously more common than any where else. If we can find any peculiarity of constitution incident to a class, and can trace a connection between it and the frequency of uterine disease in the same class, then we may be able to determine with more accuracy whether this constitutional state precedes as a cause the local manifestation, or whether the latter precedes the former.

Our grandmothers and great-grandmothers did not even know of the existence of those peculiar diseases that so afflict their grand-daughters. We may properly infer that with them these diseases did not exist; or, if they did exist, the fact would prove the whole argument, for they had not power to produce sufficient constitutional disturbance to make the individual aware of their existence. There are communities to-day where women are no more afflicted with the forms of disease under consideration than our progenitors were. Dr. G. H. Taylor, while on a visit to Stockholm, Sweden, reports that, among several hundred patients at different institutions, *only three* had any form of uterine disease; and on inquiry, the physicians assured him that these diseases are almost wholly unknown in that country. Swedish physicians are second to none in Europe; and if they had existed, must have known it, as they were familiar with their existence in other countries. Let it be remembered, however, in this connection, that the Swedish ladies of the highest class

not only attend to their own household affairs, but multitudes systematically practice at the public gymnasia; and the poor women, as the Dalecarlians, labor in the open air. Even in England, I know, from personal observation and inquiry, that such diseases are much less common than in this country; and it is well known that an English lady not only possesses a good degree of muscular strength, but she is not afraid to put it to daily use.

I do not wish to unnecessarily reproach my countrywomen—possessing, as I believe they do, in a higher degree than the women of any other country, some of the noblest virtues that adorn the sex; but if there is anything in their surroundings or habits of life that favors the production of the disease under consideration, the physician would do less than his duty did he not point it out to them. I know it is often said that the women of the rural districts of the country, and even the wives and daughters of farmers and mechanics, who are accustomed to daily labor, are as subject to the same diseases as the wealthy inhabitants of the city. But the condition of women in the country is far from favorable to the promotion of robust health. It is not similar to the condition of any other class of women in the world. Educated in the same schools, certainly in the same literature as their more wealthy sisters of the city, and numbering scarcely less of the accomplishments; vying with their brothers even in the higher mathematics, establishing a high degree of mental, and totally neglecting physical culture, they

are in the most favorable condition to speedily break down, on assuming the cares and labors of the farmer's wife. This process is wonderfully accelerated by the precocious sensibility of the nervous system, generated by an absurd stimulating system of education.

During the continuance of the whole course of boarding-school education for young ladies, there could not be a more ingenious device for rendering them physically weak and inefficient. The daily slow and measured walk of a drove of these young ladies "around the square"—following in the wake of some superannuated dame—so far as the purposes of physical culture are concerned, ought not to be dignified by the name of "exercise."

Still more pernicious, if possible, than the neglect of well-directed and careful muscular exercise, is the early, almost exclusive, cultivation of *nervous susceptibility*. Nowhere in the wide world are there such well-appearing young girls—taking the well-bred *lady* as the standard—as here; but their manner is that of *ladies*, not of girls. There is a precocious quickness of perception and early formation of character that is quite unphysiological, and stimulated to an inordinate degree by too early introduction to society. The result is, that the capacities of the system are perverted from tissue-making, and absorbed, as it were, in the sensational life. The body is literally *starved*, while the nervous system is stimulated to the highest degree. With the unnatural cultivation of the sensational and emotional faculties, first the desire, and then the abil-

ity to perform an adequate amount of muscular activity is lost. By the unnatural cultivation of the sensational and emotional faculties, I do not mean an illegitimate cultivation of them—for purer can not be found than our countrywomen; but their development *before their time.* They are like a plant pushed to a luxurious growth of stalk and leaf before it has taken root or formed sufficient woody fiber. There is much succulent beauty, but little enduring strength. Let the development of body be far advanced; let the tissues become consolidated; let there be again established a period of romping girlhood between ten and sixteen, and the most of this time devoted to mental relaxation and physical culture, and then the danger will have passed. Now, if after such a course of education in early life, as is the rule and not the exception in this country—a course which, by neglect of all proper attention to physical development, has rendered all the tissues soft and weak—a young lady enters direct upon any of the duties of after-life which demand endurance—and such duties there are in every station in life, and particularly in the country—the task is more than she is fitted to bear. Too much as well as too little muscular activity will produce the same atonic condition of the tissues. Thus the seeds of future disease are generally sown in early life at boarding-schools.

This statement has not been overdrawn. The principal of one of the most popular of our city boarding-schools (as it is one of the most deserving) told me, a

few days since, that she considered almost every one of her pupils a fit subject for medical treatment. The principal of one of the best ward schools of this city, having over three hundred girls under her care, told me that both teachers and scholars are constantly overworked, and a large per cent. break down, as a consequence, every year. A little girl of thirteen, a member of the same school, was brought to me by her mother for some ailment. She was naturally delicate, was deformed, and had been confined to the bed several years with Pott's disease of the spine. On inquiry, I learned that she had to study from *fourteen* different books! It is not necessary to notice the evil effect upon the mind as well as body of such a system.

The consequence is, that few of our women have any adequate firmness of muscle. There is begotten a softness and atonic condition of all the tissues. This condition, of itself, does not imply either emaciation or actual disease, but a lower tone of physical health, *a want of endurance* out of proportion to the size of muscle and the apparent general health. Indeed, such persons are generally rather plump while young, and in the absence of any untoward circumstances, consider themselves well. But the actual condition of their muscular tissues, compared with a *perfectly* healthy condition, is like the soft, dry, pale pectoralis muscle or "breast" of a domestic fowl which is seldom used, compared to the firm, juicy, dark-red muscle of the wild birds that use them constantly in flying. The effect of this condition of tissue in its tendency to the

production of the diseases under consideration, may be considered under three heads, viz.: that resulting mechanically from the lack of firmness in the tissues; that relating to the circulation; and the condition of the general nutrition.

1. A little weakness of the muscles of the back, a slight increase of the natural curvatures of the spinal column, a little more than natural inclination of the neck, will cause the chest to sink, and the anterior extremities of the ribs to fall one or two inches, and no one will be able to detect it without contrasting this with the correct position. Thus the costo-pelvic attachments of the abdominal muscles become approximated, and the muscles themselves relaxed; the contents of the abdomen, also, being in the same atonic condition as the other tissues, follow the retreating muscles toward the pelvis. If there be constipation, so much the worse. How could there be a condition more favorable to displacements of the uterus? The uterine broad ligaments, themselves relaxed like the other tissues, have to support not only the bowels above, but the diaphragm, a powerful muscle, glistening with tendons, is constantly forcing with each inspiration the whole abdominal contents down into the pelvis. Add to all this, as we too often must, heavy skirts, long waists, and tight corsets, and we have a splendid *mechanical* arrangement for forcing the uterus from its place, slightly suspended at the superior strait of the pelvis as it is, down upon the pelvic floor. The only wonder is that it succeeds no oftener.

Hence we arrive at the first indication for treatment, viz.:

Relieve the uterus from the weight of organs above it by strengthening the muscles of the BACK, CHEST, AND ABDOMEN. This is the best *pessary* that can be used!

2. There are several agencies concerned in the circulation of the blood; the action of the heart and large arteries, capillary attraction, the affinity between the blood and the tissues of an organ in action, and the mechanical pressure of contracting muscle upon venous capillaries. That the heart's action is seriously disturbed, in anæmic girls, is well known. But muscles that are but little used have less affinity for the blood, and the mechanical assistance from the pressure of contracting muscle is almost entirely wanting, which is the condition in chlorosis. Hence, no wonder that these cases are notorious for the coldness of the extremities—in many cases naturally warm feet being a luxury seldom realized; and this coldness often extending above the knees.

Now, with this imperfect circulation—the blood accumulating in central organs—favoring visceral congestions, add the physiological engorgement of the uterine organs at the regular menstrual periods, while, perhaps, these organs are more or less displaced by the previously mentioned mechanical causes; and no wonder that they are so often unable properly to perform their functions. Excessive, scanty, or painful menstruation may be looked for; ulceration of the canal

of the cervix, hypertrophy, and induration may be expected to follow in natural succession. Hence, we declare the *second* indication of treatment, viz.:

To relieve uterine congestions, promote a peripheric circulation. The circulation may be directed outward, by instituting the proper condition for accomplishing that purpose. Without extending the argument, it may be said that the best condition for this purpose is to cause muscular contractions in the extremities, while the trunk and visceral organs are in repose, because the circulation flows *toward* organs in use, and away from those at rest.

3. The absence of tonic health of the muscular tissue alone—constituting, as it does, about half of the gross weight of our bodies, and, by its active transformations while in healthy use, receiving much the largest part of all our tissue-making food—has a vast influence in deteriorating the plastic quality of the blood, and through the blood, of all the tissues of the body. Hence, we derive our *third* indication of treatment, viz.:

To heal uterine ulcerations and correct abnormal secretions, secure a purer quality of plastic material by the increased oxydation of the blood, consequent on muscular action.

But here, at this point, we have two formidable difficulties to encounter. *Exercise*, as ordinarily understood, can not, as a general thing, be taken by women laboring under diseases peculiar to their sex. Indeed, this inability to take exercise, to walk any distance, to

go up and down stairs, and the like, is a good diagnostic symptom in these diseases. The increased soreness and backache, the "bearing-down" sensations attending every effort, and the marked increase of all the most unpleasant symptoms, utterly preclude, in most cases, any effective exercise of the ordinary kinds.

The second difficulty in the way of muscular effort that we have to encounter is the depression of the nervous system, which renders exercise, where it otherwise can be taken, so quickly followed by *fatigue*, that it is often a question whether such attempts do not do more harm than good. The cold feet are often found to be colder, and the symptoms of uterine congestions greater after a walk than previously; and, instead of refreshing, fatigue and exhaustion are apt to follow—so that it is with some propriety that physicians have ordered rest, and even the recumbent posture, in these cases.

But are the physiological objects to be secured by muscular action any the less *desirable* because circumstances peculiar to these cases abridge or preclude the employment of ordinary exercise? By what means can the relaxed tissues, the unequal circulation, and all the train of evils depending on this inability to muscular exertion, be remedied, except through these manifestations themselves?

Fortunately, all these difficulties can be easily overcome. *First, then, the muscles should be brought into action* ONLY *in such positions and in such a manner, that none of the symptoms following ordinary exercise*

can occur. This rule is unvarying. It is easy to see how the muscles of the arms and legs may be brought into the most powerful action, if necessary, while the patient is lying on her back, by the aid of assistants and contrivances, in such a manner that the uterine organs may at the same time be *relieved* by the position, instead of being impinged upon by the weight of superior organs, as in the erect posture (see fig. 69). So all the muscles of the back, chest, abdomen, etc., may be brought into action, of any degree of power, in such positions of the trunk and with such a direction of the mechanical force, that none of the ill effects of ordinary exercise can follow.

With reference to the debility of the nervous system, we find, as has been previously stated, that fatigue occurs in the ratio of the *intensity* of the *effort*, and *not* in the ratio of the force of muscular contraction. For instance, to *run* a certain distance will be followed by fatigue; while to *walk* the same distance, taking the same number of steps, and using the same muscles, is not followed by any such effects. This rule is unvarying in all possible circumstances of muscular effort. But the effect upon the mass of the tissues is in the direct ratio of the *continuance* of the movement, or the length of time that the muscle is held in contraction, as greater time is afforded for the contraction to propagate itself through the length of the fibers and the mass of the muscle, and for the circulation to arrange itself under this stimulus, and plasma to be thrown out, to repair the waste caused by the muscular

effort. Hence we deduce the following rule, viz.: *To gain the greatest results with the least fatigue, let all movements be done very slowly, and the force of contractions increased by resistance opposed.*

Thus we have perfect control of every movement; can regulate its force most perfectly to the strength of the muscles, and can direct it to any portion of the body. This principle of controlling the circulation by muscular action is beautifully illustrated in cases of ordinary menstrual suppressions, so often met with among school-girls, depending on colds, wet feet, or other causes of deranging the circulation, and before there is serious constitutional disturbances; those cases in which Elixir Pro. is generally employed. Figure 62 illustrates a favorite method of stimulating functional activity in the uterine organs, by bringing an increased amount of arterial blood in their vicinity. If the patient be seated in an easy-chair, and the mass of muscles inside of the thighs—the adductors of the leg—be made to act powerfully, by slowly drawing the knees apart against the firm resistance of the patient, an actual congestion of the parts adjacent to the uterus can be produced, and menstruation will speedily be established.

FIG. 62.

Abduction of legs against resistance—producing congestion in adductor muscles, for re-establishing menstruation when temporarily suspended.

I have now in my mind several cases of suppression,

continuing from three to six months, being re-established in less than a week, by this and kindred movements.

It is generally understood that suppression or retardation of menstruation in girls is not often owing to any special disease of the uterine organs. Menstruation will always take place whenever there is ability of the system to develop another germ in the ovaries. In ordinary cases, suppression and irregular or painful menstruation are but local symptoms of an impaired state of the general health, which affects the functions of the uterus and ovaries scarcely more than it does that of digestion and other kindred manifestations.

But while much of our treatment should always have reference to the general health, particular care should be taken that the peculiar functions of the ovaries and uterus should not be retarded by any maldistribution of the circulation, but that they are rendered easy by plentiful supply of arterial blood in contiguous parts.

Another excellent means of accomplishing such a purpose is shown in the cut. (Fig. 63.) It represents a twisting of the leg at the hip, by which all the muscles contiguous to the uterus are put into *isolated* action, and hence must receive an extraordinary supply of blood compared with ordinary diffused efforts.

Such movements as represented in figs. 62 and 63 have more immediate effect upon the uterine organs particularly to stimulate their action, but it is equally

important, in almost any of the affections under consideration, to counteract the characteristic tendency of the blood to forsake the lower extremities, and accumulate in organs higher up. Indeed, in ordinary cases of irregularity or suppression of menstruation, if we can overcome the habitual icy coldness of the feet and lower part of the legs, and can succeed in establishing an habitual natural warmth, our efforts will be ended, for we shall have cured the disease.

Fig. 63.

Twisting the leg—increasing the circulation in muscles of thigh and nates for re-establishing menstruation, etc. See also figs. 69 and 70.

For this purpose such movements as are represented in fig. 33 (foot rotation), and in figs. 30 (leg extension) and 31 (knee bending), and others for the same purpose, should be unremittingly persevered in till this object is accomplished. There are few cases of ordinary irregular menstruation, not depending on actual organic disease, which would not be cured by such a course of treatment, provided there was not too much deterioration of the general health to begin with.

Thus much for the common, and always anxiously regarded, temporary suppressions in girls, when it is desirable to stimulate simply the menstrual function.

The next class of these cases, but slightly removed from the first, is that where the general health is

more affected, as noticed in the vitiated secretions in the form of leucorrhea, the back-ache, quickly-coming fatigue on exertion, and possibly some slight bearing-down sensations in the lower part of the abdomen, especially at the periods of menstruation. These cases often are not strong enough to respond with sufficient readiness to local impressions, and hence the first matter to regard in their treatment is to increase their general health. It would be difficult to produce congestion of the muscles about the pelvis in an anæmic woman, simply because there is already too little blood in the system. We should not rely on simply stimulating the uterine organs, but should first endeavor to improve the general health so far that the system can respond to special impressions, when local derangements will be likely to pass away of themselves, or with very little special treatment.

In many of these half-sick, half-well cases, any course of hygiene, and especially any course of exercise that would distribute the circulation and impart tone and firmness to the muscular fiber, would be attended with the best results. But the majority of them are already past the time when voluntary exercise is of that service which, without reflection, it would seem that it ought to be. The lax, soft nature of their muscular tissue and the depression of the nervous system render ladies with these affections—even when the state of the local disease does not prevent—very quickly fatigued on attempting to do anything. It is a fatigue

or exhaustion of the nervous system, and is apt to come on before the muscular system has got any adequate exercise. So that in many of these cases adequate muscular exercise would be impossible, when it is of that general kind ordinarily attempted.

But these are cases where muscular exercise is most of all things indicated. There are the weakness and relaxation of the muscles of the back, chest, and abdomen; the cold extremities; the thin, poor blood—none of which could co-exist with strong, healthy, well-developed muscles.

Any strong, slow, continued action of the muscles, which would cause a large change in the substance of that tissue, and promote its development, and which would not be too exhausting, could not fail to be beneficial, provided they were so arranged as to secure those special results above indicated.

For those cases able to be about, and to take a little exercise, though not enough to sensibly ameliorate the local or general derangements, nothing can be more useful, in the absence of the more localized movements, than the movements represented in the accompanying cuts (figs. 64 and 65). They are chosen to be here introduced because they illustrate at one view several important ideas connected with the treatment of these cases, though in actual practice a variety of more localized movements are more frequently used, but which, being more complicated, could not be so well exhibited by figures. It must be repeated, that the figures in all parts of this work are simply to illus-

trate the *principle* of the treatment, and not necessarily the actual movements most commonly employed.

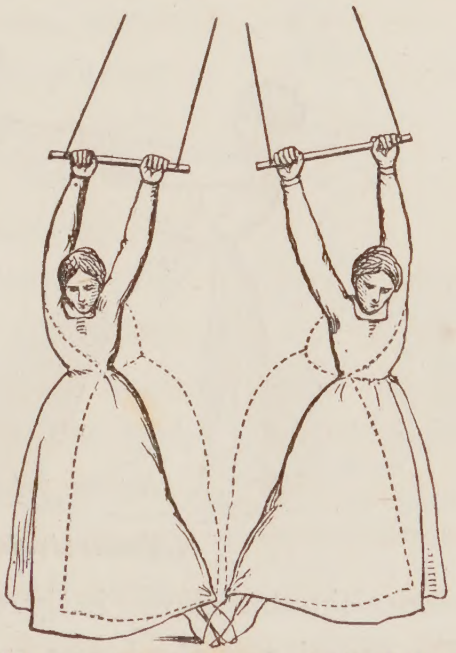
The swinging-pole movements (figs. 64 and 65) are made with a pole two feet long, attached to ropes at each end, which pass through pulleys above to the side-wall, where they are fastened on a pin. This arrangement enables the pole to be elevated or lowered at pleasure, to accommodate different heights. The patient takes hold of the pole within about six inches of her head, the elbows being bent. She then leans backward as far as the pole will move, where she must sustain the weight of her body by the muscles of the back, shoulders, and arms. She stands for a moment in this position, with the hips slightly bent and pushing back with the feet, when she raises forward the hips (using the muscles of the back, and *not* drawing herself by the arms), as shown by the dotted lines, till she moves over to the next position forward, when the muscles of the chest and abdomen sustain the weight of the body. In this position, in which she also remains for a few moments, the chest is expanded, the ribs everted, the

FIG. 64.

Movement for the general circulation, and to strengthen the back, chest, and abdomen.

contents of the chest and abdomen drawn high up, and all the muscles of the anterior part of the body are brought into prolonged and powerful, but easy action. The movement is done forth and back fifteen or twenty times. The kindred movement, shown in fig. 65, is made in a similar manner, only it is made from side to side. Let the body bend through the waist and sink low down, and then remain a short time sustained by the muscles of the *side;* then the middle of the trunk is raised by the action of those muscles (*not* by the arms and shoulders), as shown by the dotted lines, and so on over to the other side, as seen.

FIG. 65.



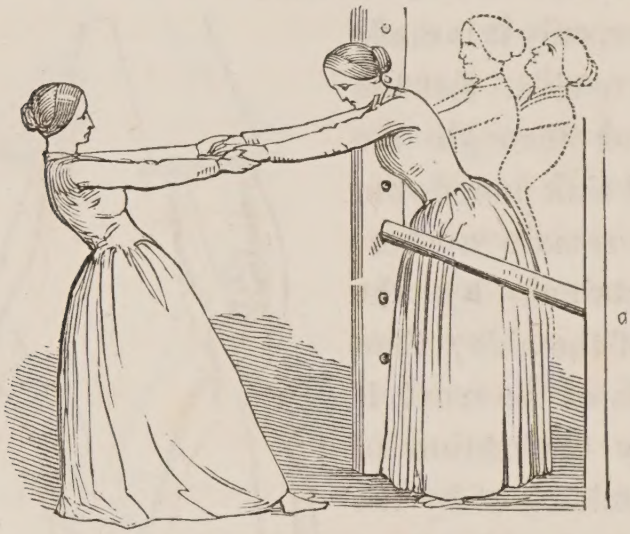
Movement for the general circulation, and to strengthen the loins.

If this simple contrivance were arranged in every boarding-school for young ladies, and two minutes—only two minutes is all I would ask—three times a day were taken from listless piano practice, and devoted to taking the movements just described, it would save many a young lady from an after-life of disease and misery. It is peculiarly adapted to counteract many of the pernicious habits of civilized society—the feeble circulation, by the strongest contractions being in the extremities, and thus making the blood flow outward;

the weak back, by bringing its muscles in powerful but easy action; the sunken chest and falling bowels, by expanding the former and raising the latter, and by giving muscular tone to the whole body.

If it is desirable to strengthen the back alone, move-

Fig. 66.



Movement to strengthen the back.

ments like that shown in fig. 66 will be found very useful. The muscles of the lower and weakest part of the back are put into as strong action as is desired, the force employed being regulated by the resistance of the assistant to correspond very nicely with the patient's strength. The patient stands, leaning over a bar, with the thighs against it, when she raises up against a certain amount of resistance. This and all similar movements should be followed by the recumbent position, such as that the muscles of the back will be completely relaxed. Strong muscular action, followed by complete rest, affords the best conditions for muscular development. To strengthen still

further the muscles of the chest and abdomen, the movement represented by fig. 67 will be found most excellent. It is a twisting of the trunk, by bringing into action particularly the transverse and oblique muscles of the abdomen. The patient sits, with the hands on the head, and the knees firmly held, as seen in the cut, when an assistant, standing behind, placing his hand on each elbow, slowly twists the trunk upon the hips and through the abdomen—passively or against the patient's resistance—or the patient may twist and the assistant resist, or both, as the case may be. In this movement muscles are brought into action, as any anatomist can tell, which in the ordinary life of a lady are scarcely ever sufficiently used. It imparts strength to the chest and abdomen, particularly to those muscles which hold up by their tonic firmness, or let down by their weakness and relaxation, the contents of the abdomen.

FIG. 67.

Developing the oblique muscles of the abdomen by twisting the trunk on the hips.

Another excellent movement for the class of cases under consideration is the stretching up of the arms, as shown on page 217, fig. 49. Of course, constant care should be taken to keep the circulation well diffused, as the best possible means of preventing or relieving those unfortunate uterine congestions to which these cases are liable.

Thus far, the cases under consideration have been

those supposed to be in the first stages of uterine disease; or, more properly, we have supposed the existence of all the constitutional conditions favoring its production, with the most prominent symptoms of the disease in its incipient stages, and with the graver forms of the local disease itself near at hand.

Let us now pass on to consider the treatment of the more palpable diseases of the uterus—the dislocations, hypertrophies, indurations, and ulcerations of that organ.

It must be recollected that our treatment is the inevitable result of the previous showing, viz.: that a majority of these diseases (mind, I do not say *all* cases) are induced in consequence of the imperfect circulation of the blood, the inadequate oxydation of the blood and tissues, and the disarrangement of location of superior organs, owing to the soft, feeble, and relaxed condition of the tissues, and particularly of the muscular tissue of the back, chest, and abdomen.

Such being the case, the treatment by strengthening the muscles follows as inevitably in the severer as in the milder forms of the disease; but in these cases it may be accompanied, when necessary, by such topical treatment as the circumstances may require. And it is one of the beautiful features of this treatment that it does not conflict with or supersede any other legitimate means.

In dislocations of the uterus, patients are more or less precluded from taking adequate exercise, owing

to two causes, viz.: the action of gravity upon the uterus (and superior organs), in its abnormal situation, aggravates the dislocation and increases the irritation of itself and contiguous organs; and the great fatigue attending efforts under such unfavorable circumstances. Hence this rule:

We must bring the muscles into proper action *in such situations that the specific gravity of the displaced organs will* AID *in their restoration.*

The altered situation of the uterus, in the position frequently assumed by the patient during the use of the Sims' spatula, first suggested to me the employment of a *movement* in this position, to act in accordance with gravity in elevating the uterus—and not the uterus only, but all the pelvic and abdominal organs—out of its depressed situation.

An illustration of one movement* for attaining this end may be seen in fig. 68. The patient lies with the chest supported on one bench and the knees resting on another, with the body suspended between them. The hips are kept from settling down by the action of the abdominal muscles. Now, without moving the chest, the hips are raised by a strong action of the muscles of the abdomen till they

FIG. 68.

Raising the hips by the abdominal muscles—a movement for prolapsus uteri.

* This movement is equally useful in prolapsus of the bowels, piles, etc.

reach about the point represented by the dotted lines. The strong action of the abdominal muscles in that position, aided by gravity, tends to bring all of the contents of the abdomen and pelvis farther up (*down* during the movement) toward the diaphragm. The hips are raised and lowered a sufficient number of times. The assistant places her hands each side of the hips, and increases or diminishes the force of the movement by resisting or assisting, as the patient's strength may require.

One of the very best means of increasing the general strength, in cases not able to take sufficient voluntary exercise from any cause, is by active or passive stretching of the muscles.

Fig. 69 represents such a stretching of the muscles.

FIG. 69

Passive stretching of the muscles in delicate persons, to warm the surface and give general muscular strength.

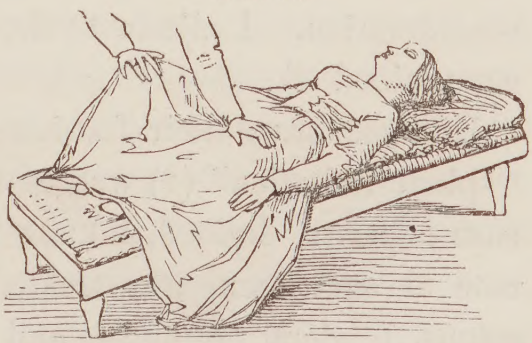
The patient lies on her back, while two strong assistants pull at the feet and hands, thus putting all the muscles of the whole body upon the stretch, with contractions increasing toward the extremities, where the force is applied. It is always followed by a pleasant glow of warmth on the surface and in the extremities. The position is such that the uterus is not depressed by the action of the abdominal muscles, as it would

be in the erect position. By having the patient lie on her face instead of the back, the tendency of the muscular action would be to elevate the uterus the same, though in a less degree, as in the previous illustration (fig. 68). The force used must be proportioned to the patient's strength. If she is able, she may make resistance, thus intensifying the effect of the movement.

With reference to the indurations and ulcerations of the uterus, and the vitiated secretions of the uterus and vagina, they will, in most cases, ultimately disappear, after the complete establishment of a free peripheric circulation, the formation of abundant, well-oxydized blood, and the development of firm, strong muscle.

But the re-establishment of a healthful in place of a diseased action in those organs will be very much hastened by promoting the completest development in parts contiguous to the disease. Still, having reference to position, fig. 70 represents a separation of the knees against resistance. The patient lies on the back, with the knees drawn well up (as seen in the cut), the rest of the body being passive. The position is such that the movement affects the muscles of the perineum, as well as those inside

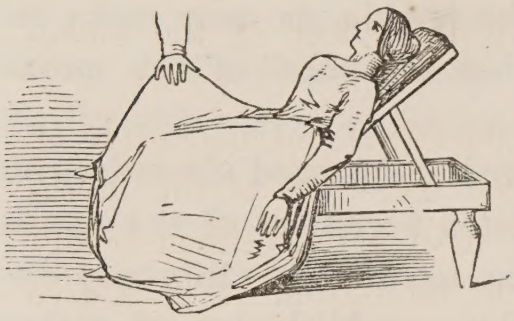
FIG. 70.



Knee separation - acting on the perineum and adductors of the thigh to invigorate the uterus.

the thighs, which tends rather to elevate the organs of the pelvis, there being no depressing force from the abdomen, either from its weight or contractions of its muscles. Fig. 71 represents the raising of the knee in the sitting position. It may be done in the lying position, but as this movement involves some action of the abdominal muscles, there is not so much choice. The object of the movement is to bring the psoas and iliac muscles into action. The twisting of the leg at the hip, shown in fig. 63, is especially useful for the purpose of invigorating the uterus.

FIG. 71.



Knee raising—acting on the iliac and psoas muscles to invigorate the uterus.

There is one symptom that is so common and so distressing withal, not confined to cases of undoubted uterine disease, but nearly always present in an aggravated form when these organs are in any manner affected, that I can not pass it over without a moment's consideration. I allude to the back-ache so generally complained of.

Diseases have their fashions, and a few years ago "spinal irritation" (?) was as frequent as uterine disease is now. Indeed, I know a lady who, being delicate at seventeen, was treated for several years by setons, blisters, cuppings, and the whole category of counter-irritants, for "spinal irritation;" then, several years later, without any change in the symptoms, she

was subjected to topical treatment for uterine disease; and now, for the last two or three years having had no medical treatment, she feels rather better, though by no means well.

I believe most fully, with Dr. Thomas Inman, that there is no such pathological condition as "spinal irritation," in the sense in which it is ordinarily used. The sensation of soreness caused by pressure along the spine is not the symptom indicating any known disease of the spinal cord—diseases of the nerves manifest their existence in a totally different manner; but it *is* a symptom of muscular weakness and fatigue. The locality of the pain and soreness is exactly where we should expect it to be when referred to muscular weakness and over-exertion as its true cause. Beginning above, and searching downward, we find this soreness at the base of the skull, at the lower part of the neck, and frequently referred to the prominent seventh cervical spinal process; we find this soreness more marked *each side* of the spine, or near the transverse processes, differing in intensity in different locations, till you reach the aponeurotic expansion over the sacrum, where it is generally the most severe.

In all cases this aching and soreness is in the vicinity of the origin or insertion of muscles, especially at the musculo-tendonous union. But it is not by any means confined to the back; though, from the structure of the spinal column, it is necessarily somewhat more circumscribed there. But a weak muscle always gives signs of its weakness. This aching and soreness is

very constant in many of the same cases at the origin of the pectoralis major, at the lower border of the breast, and is often erroneously referred to the latter organ, giving the patient indefinite fears of cancer; at the costal insertions, the lineæ transversæ, and particularly at the pubic origin of the abdominal muscles. The soreness and aching at the coccygeal attachment of the muscles of the perineum is obviously produced from the same cause, increasing with the amount of prolapsus and the strain to which these muscles are thus subjected.

The weaker the muscle the greater its irritability, and consequently the greater comparative expenditure of force employed to accomplish a purpose. The contraction of a debilitated muscle is more like a spasm, and unlike the contraction of a healthy, well-nourished muscle, which uses only so much force as is necessary to overcome a resistance. Hence, weak muscles are constantly liable to unnecessary overdoing, so that the necessary muscular efforts of moving about, or even of sitting up, may be overdoing to very weak muscles.

Even sitting all day long, as many ladies are in the habit of doing, allowing the muscles of the back neither the invigorating variety of active exercise, nor the perfect rest they occasionally need, is quite enough to account for the back-ache such people so constantly complain of. In constant sitting or standing, the body must be as constantly sustained by unremitting efforts of the spinal muscles; *they* must work, whether the person does or not, and working they tire out. Hence,

it is easy to see how this back-ache and soreness may be kept up for an indefinite period, when the conditions are favorable, by the ordinary muscular effort in sitting or moving about.

Dr. Inman, apprehending the true cause of this symptom, very gravely recommends *rocking-chairs* and the recumbent position as the true remedy. Of course, rest to overdone muscles will give relief; but how are they ever to get any stronger? The true remedy is rest *and* exercise. Let the rest be *complete relaxation* of all muscular effort—not the entertaining of company, sitting bolt upright, so that the spinal muscles must be constantly acting; or reclining in a "graceful attitude" on the lounge, with book in hand; but a completely sustained position, when *all* the muscles must cease to act. Then the exercise to follow should be short, varied, and taken with some vigor.

There are many incurable cases of prolapsus, retroflexion, induration, etc.—incurable so far as bringing about a complete restoration of the organ to its normal position and consistency—that may find relief from much of their suffering, and be made comparatively comfortable by pursuing the course here indicated. While it is not denied that there are cases where topical treatment is beneficial, still there are many evils flowing from it that it seems impossible to avoid. One of the most important of which is, that the patient's *attention* is habitually directed to the uterine organs as the cause and seat of every discomfort. The result is a marked state of mind with reference to the seat and

character of her disease. There can be no doubt that the local disorder is often greatly aggravated by the state of mind with reference to it. Besides, it often happens that the uterus is bound down by adhesions, and has formed for itself a new situation, and the adjacent parts have become disposed with reference to this position, and it is both unwise and unnecessary to disturb it. Indeed, in many cases it is impossible to do so. Besides, the constant handling, cauterizing, and disturbance must eventually increase the congestion of the parts.

Why is it that some women—those that present themselves at the college clinics, for instance—walk about in comparative comfort, with an amount of displacement and disease that would lay their more tender sisters on their backs, not with imagined, but with actual suffering? The difference is only accounted for from the fact that sensibility (or irritability) of the nervous system seems to be in the inverse ratio with the cultivation of the muscle. So that in those cases of undoubted uterine disease, even where from the nature of the case a radical cure can not be hoped for, a certain amount of relief can still be expected by the treatment here proposed. By invigorating the general health, an amount of local disease may be borne with far less discomfort than could be if such general invigoration were not attempted. One case so well illustrates this truth that it is given:

A lady had had a bad getting-up after the birth of her child, seven or eight years before. During all this

time she had been under the care of different physicians, but the precise history of her case, at its various stages, it was impossible to ascertain with sufficient definiteness to recapitulate. She had been confined much to her bed, and was very much emaciated, weighing only about seventy-five pounds. The uterus was resting on the floor of the pelvis, with the fundus thrown back upon the rectum. She could walk but very little. For some time the attempt was made to keep the uterus in its proper position by frequently replacing it, but in a very short time it would return to its former situation, resting on the perineum. At last the endeavor was to increase her strength up to the point where she would be able to bear the uterine disorder without so great suffering. Proceeding on this principle, the result was entirely successful. She gradually gained her strength, and left for the country, decidedly improved. In about one year she called upon me, so changed for the better as to be scarcely recognized. The uterine trouble still existed, without much change, but the inconvenience arising from it was now reduced to its minimum, and with care she was enabled to enjoy a very comfortable degree of health.

One other case I can not withhold. A lady, aged about thirty-five, married nine years, never pregnant, had been afflicted for many years with chronic enlargement and induration of the uterus. Menstruation was painful and scanty, generally preceded or accompanied by irritation of the bowels and diarrhea.

All the prominent symptoms usual in such cases were present. She was in good circumstances, and had employed the most eminent physicians, the last of whom put her case into my hands. The treatment continued for about five months. The result was an amelioration of all the symptoms, though not a complete recovery at that time. But in her case, as in the majority of cases treated by the Movement-Cure, the improvement continued to progress long after cessation of active treatment, and in about a year she became the mother of a fine, healthy child. She is now in good health.

Disordered menstruation, leucorrhea, prolapsus, and even ulceration of the cervix uteri, are frequently met with, even in young unmarried women of sixteen or eighteen years of age. I believe that the treatment here advocated—that of giving firmness to all the tissues, and a proper direction to the circulating fluids, and increased nutrition in those organs specially implicated, by a proper use of the muscles—is based upon the true pathology of these cases. Setting aside those diseases of the uterine organs arising from accidental causes, in strong women, we have the vast majority remaining which would legitimately come within the benefits of this treatment. Though the true physician will never hesitate to do his duty, yet to be obliged to make repeated personal examination of a delicate young lady, and, indeed, of any lady, who is so unfortunate as to require topical medication, is often as disagreeable to him as to his

patient; and any treatment that will diminish the necessity, and lessen the frequency of such examination, ought to be hailed with joy by the profession and the public.

Experience proves that, in the treatment here advocated, such an examination is not always necessary —even where there is undoubted uterine disease—and more frequently need not be repeated after the true condition of the organs is ascertained. The prolapsed uterus will resume its place, or at least will give no longer symptoms of displacement, the ulcerations heal, and pain and soreness subside under a physiological course of treatment; and still more important, the patient is almost insured, so long as she keeps her muscles strong, and blood pure and properly circulated, from a recurrence of the disease.

But not less beneficial is the treatment here advocated, to a class of females who, as the French say, "watch themselves live;" who are far from being well, yet having no particular disease, seize upon every symptom, and magnify it to the cause of all their troubles—and now-a-days the uterus receives its full share of their attention—and who are never satisfied except when being treated for their favorite symptom, though it may have little or nothing to do with their condition. To such, this treatment answers the indications completely. It gives them something to do; diverts their attention from a local trouble to the general system; and the development of muscle acts as a counter-irritant to the morbid nervous state.

CHAPTER XV.

DERANGEMENTS OF THE NERVOUS SYSTEM.

NERVOUS IRRITABILITY—How Produced—A Distinct Disease—Illustrated by Paralysis—Expenditure of Force—Undue Waste of Nervous Force—"Irritate the Muscles"—"BED-RIDDEN" WOMEN—Illustrated by Fright—Treatment—Counter-Development—Charlatans—Applicability of the Movement-Cure—A Case to Illustrate—Treatment—Analogous Cases—Nervous Irritability and Muscular Action—Nervous Depression—The Difference.

BY derangements of the nervous system I mean those functional deviations from its healthful manifestation commonly, but rather indefinitely, designated as hypochondria, hysteria, nervousness, "nervous irritability," nervous depression, etc., when disassociated from actual organic disease.

These derangements of the nervous system possess many peculiarities, and are exhibited in various forms. But they all have one characteristic in common, in that the impressions and sensations of the individual are not true indices of his or her actual physical condition. What such individuals feel or suffer is not in the proportion of the cause producing it, and what they can do is no guide as to what they, under other circumstances, might have power to do. Their nerves of sense and sensation are like so many microscopes to magnify every impression, affecting their easily excited nervous system into an actual pain. There generally

is debility; but whether there is or not, there always is hyper-*irritability* of the nervous system. And whatever form the peculiar exhibition of this irritability may take, the object of all treatment must be to allay it. Most of these cases possess no structural disease whatever; still, as every disturbance of physiological manifestations must be brought about by some sufficient agency, these disturbances of the functions of the nervous system are the result of previously acting disturbing causes. But it unfortunately happens that the cause of a disease may entirely pass away, and still leave the disease it produced remaining. The shock of disease may produce a disturbance that is itself self-propagating, till some counteracting condition is set up commensurate with the initial cause. A person recovers from a severe sickness, with no actual disease remaining, it may be, but with "shattered nerves"—a condition of the system which remains long afterward. Under such circumstances, the system forms a *habit*, which continues as a distinct condition, as a scar remains after the healing of a wound.

These functional derangements of the nervous system must be regarded as distinct diseases. Whatever mental peculiarities may accompany them, if there be hallucination on any subject, it is the product of the disease, rather than the cause of it. These nervous derangements are better illustrated by the condition in paralysis than would at first seem probable. As in some cases of paralysis we have a suspension of the conducting power of a nerve, caused by some shock,

which may continue as an independent condition, arising from a habit of non-use, so over-activity of the nervous system may remain after the passing away of the disturbing cause, as a distinct condition arising from a habit of over-use in certain directions. And the treatment of these two conditions of the nervous system will also illustrate one another. As in paralysis we endeavor to arouse a dormant nerve or nervous center to activity, by powerful efforts of the will upon the affected parts, while the unaffected portions of the system are at rest, so, on the contrary, to allay over-activity (irritability), we irritate the muscles while keeping the nerves at rest.

The propriety of allaying nervous irritation by irritating the muscles, will be still more apparent when we consider that, in this hyper-activity, which has become a habit of the system, there is an undue proportion of the vital forces drawn off in this direction, leaving other physiological manifestations as much depressed as this is exalted. By exaltation is not meant actual strength, but a use and waste of power which otherwise might be converted into nervous strength and endurance, or other available force. Our efforts, then, must be directed to equalizing the expenditure of force between the different vital manifestations. If the nervous system, as in the cases under consideration, from its perturbed condition, has been in the habit of expending an undue amount of force, taking so much away from other manifestations, then the true way to depress the one will be to exalt

the other. Now, if this undue expenditure of force be in the direction of nervous irritability, it must subside on changing this expenditure into other channels, as in the development of muscle. Let the resources of the system be engaged in the processes necessary in the development of muscle, and "nervousness" would be impossible. This would be a true, physiological *counter-irritation;* irritating the muscles to allay nervous irritability. Let there be a greater expenditure of *muscular* force; and as the whole amount of force which can be generated is limited, the waste from abnormal activity of the nervous system must be just so far limited—precisely the same as by the amount of force lost by the irritability of the nervous system, the development and use of the muscles are so far circumscribed.

This view of the pathology of these derangements of the nervous system is illustrated in those too common cases, with no apparent organic disease, denominated bed-ridden women, which are such a trial to professional skill. In these cases there is always some direction in which all the available resources of the system seem to be expended from day to day, leaving no material to be added to the recuperative energies. Sometimes it is exhibited in intolerance of light or sound, which frequently produce actual pain, but oftener an excitement or undue exercise of these senses. More frequently, perhaps, such patients exhibit some mental exaltation—it may be of an amiable kind or the opposite; intellectual or moral; but whatever may

be the direction of the expenditure of nervous force, the waste is real, and so great as to subordinate all other functions. And this condition is kept up from day to day, and often from year to year.

Let any one consider how a little fright or apprehension has "taken all his strength away," rendering muscular exertion momentarily impossible, simply because all his available force had been expended in nervous action consequent on the sudden emotion, and he can not fail to see how these cases may actually tire themselves out every day while lying in bed, and apparently doing nothing, simply by the habitual, enormous, almost involuntary, waste of nervous force.

Those who consider these cases to be the victims of some mental aberration, willfulness, or want of energy, fail to account for all the phenomena exhibited by them. The fact that they are often cured by the veriest charlatans only proves the correctness of the present views of these cases. They are seldom or never cured by any process which does not make some strong impression on them in a direction opposite that in which the greatest amount of their energy is spent. And any treatment or process which is capable of arousing the energies of the nervous system in a direction opposite that in which it is now mostly employed, will often be successful, no matter whether this means be "mesmerism," "spiritualism," or any new pathy which holds out sufficient hope to the patient to arrest her attention and keep it occupied with the new emotion. Much, however, will depend

on the intelligence and character of the patient, though her intelligence should not be too much relied upon, for the judgment is necessarily colored by the feelings.

But of all remedies for these cases, the Movement-Cure is at once the most rational and practical, and applicable to the largest number. The insuperable barrier which prevents the bed-ridden patient from the important "first step," without which she must continue to lie as before, is here avoided by actually bringing the treatment to her. The other almost insurmountable obstacle in the way of voluntary exercise, is the great effort which it requires to accomplish anything—an effort generally overwhelming, even before the accomplishment of the initial purpose—and it is wholly avoided by bringing the patient's muscles into action *without* her effort.

A case will illustrate this point. Dr. J. M. Sims, of this city, put into my hands the case of a young lady of nineteen who had been confined to her bed for six or eight months. She had taken cold during menstruation, and was quite sick for the first two or three months; but she finally recovered the appearance of health (though the catamenia was not re-established), but had never been able to stand or even to be elevated on her feet. She was cheerful, and possessed a strong desire to get well; but every effort—and they were often made—to stand or walk, was unsuccessful. On investigating the case, I came to the conclusion that the effort to use her muscles was fruitless, because, being unaccustomed to it during so

long a time, she had partially forgotten how; so that, at each attempt, she put forth so much effort that she was exhausted before the first step was taken. Hence the first step became impossible. The treatment was simple enough. I began by causing her to bend the toes of one foot. This, after a little trial, she could do; then of both feet; then she was made to flex the ankle, and afterward both ankles at once, till she could do it without difficulty.

The next day the same was done over again, adding flexion and extension of the knee; then of knee and ankle, and so on till she got control of the different movements of the lower extremities; after that several motions were united. Then she was made to use more muscular force, by having to overcome resistance —slight at first, but increased as she gained strength. And so she gained control of member after member, till in less than a week she was almost unconsciously walking about the floor. The recovery was complete in three weeks. Any physician can see how easily this case might have been added to the list of incurable bed-ridden women—incurable, I mean, by the means ordinarily employed.

These patients should not be urged to attempt too great things at first or at once; first, because it may be possible to accomplish what is attempted, and it would be a useless waste of effort; and, second, because, failing, it is a great source of disappointment and discouragement to them. But let them attempt such little things as can be easily and unfailingly done.

Any passive stretching of the muscles (see fig. 69), and kneading or squeezing of the tissues, which will accelerate the nutritive processes and cause muscular development, without taxing the nervous system, will answer the most important indications. Of course, to do this, the *morale* of the patient must be secured in most cases, in order that she may submit to the treatment; and often this part of it requires the greatest tact and the shrewdest management.

These cases of bed-ridden women are the extreme representatives of those under discussion in this chapter. The affection exists in all states, stages, and proportions in both sexes; but there is one thing which will be found generally true in regard to them, viz.:

If we can touch their muscles with a little soreness, without accomplishing it by means which will, at the same time, depress the nervous system, *from that moment the nervous irritability will begin to subside*, as the forces of the system are deviated from sensations and occupied in repair of tissues.

This is the rule; but in practice it requires the nicest discrimination and tact not to aggravate, or allow the patient to aggravate, the very symptoms we wish to subdue. For their management no specific rules can be given. All must depend on the attending circumstances. But as a general thing, the patient should be impressed with the idea that she must not regard her symptoms, be they temporarily pleasant or unpleasant; but should ignore them as much as possible, taking a course to secure ultimate immunity from them.

The treatment of nervous irritability must not be confounded with what would be proper for nervous exhaustion or prostration. Here we have only to work cautiously and slowly to build up the system little by little, being careful not to occupy the nervous force in *any* direction beyond a certain moderate limit. It is weakness, not waste of nervous force, which is the condition to be considered; and the treatment should be of a general tonic kind, and most judiciously and carefully administered.

APPENDIX.

LIFE OF LING AND HISTORY OF THE MOVEMENT-CURE.

[*From the "New American Encyclopedia."*]

Peter Henrik Ling, a Swedish physiologist and poet, born in Sjunga, Smaland, Nov. 15, 1766, died in Stockholm, May 3, 1839. He was the son of a curate, and was left an orphan in his infancy, but his education was provided for at the schools of Wexiö, and in 1797 he passed the examination qualifying him for the theological profession. From this time he traveled over Europe, apparently with no definite object, often reduced to extreme want, yet maintaining a sturdy independence of character. His love of adventure at one time led him to take part in a sea-fight against Nelson. He at last returned to Sweden, having acquired several modern languages, besides a variety of other knowledge. While at Stockholm, suffering from an attack of gout in the elbow, he conceived the idea of curing the complaint by exercise, and with this object, learned the art of fencing. His success in this experiment led him to believe that many other disorders might also be relieved or cured by suitable combinations of movements, such as would induce the proper physiological action in the part exercised. Such was the origin of the so-called Kinesipathy or Movement-Cure, a system of curative gymnastics, on the establishment of which his reputation is chiefly based. This system, now generally recognized by the faculty as a legitimate medical auxiliary, applicable especially to chronic diseases, cases of deformity, etc., is successfully practiced in Sweden by Prof. Branting and Dr. Satherberg, of Stockholm, Millicher in Vienna, Neumann in Berlin, Daly in Paris, Roth and Prof. Georgii in London, and Charles F. Taylor, M.D.,

in New York. Its practice consists chiefly in effecting certain movements by the aid of an assistant, the patient at the same time exercising his own will as directed. Thus a healthy action, instead of a morbid one, is induced in the part affected. Paralyzed limbs are exercised by movements caused from time to time by the assistant, until the muscles recover in part their healthy action, and are brought under the will of the patient. Care is always taken that no fatigue, pain, or over-exertion shall be experienced. Congestion of the internal organs is treated by exercising the muscles of the extremities, while the rest of the body remains quiet. Ling also perfected several other branches of gymnastics, as the military gymnastics, including the exercises specially adapted for developing the qualities most useful to the soldier in active service. Some of these exercises, as the bayonet-practice, are introduced in the regular drills of most civilized countries. Another branch of gymnastics which he systematized may be called the esthetic, including the art of bodily expression, as practiced in oratory, etc., while another may be styled the pedagogical, the object of which is the practice of the most suitable exercises for young persons.

Ling became a proficient in anatomy and physiology, and with scrupulous reference to the structure and functions of the human system, he studied to produce in his practice a harmonious development of all the bodily powers.

He at first supported himself by teaching the modern languages and fencing; in 1805 he was appointed professor of fencing in the University of Lund. He also lectured on the old Norse poetry, history, and mythology, and wrote dramas and many poetical essays, some of which, as the *Tirfing*, are classed among the most beautiful poetical productions in the language. He still devoted himself assiduously to the study of the curative effects of certain bodily movements; and on being appointed master of fencing at the military academy at Carlberg, he was enabled to put his ideas into practical execution, after having long struggled against the indifference of others and his own poverty.

In 1813 the Royal Central Institution was established at Stockholm, to be devoted to his especial practice, and he was made the director. Commencing upon a small scale, it has gradually enlarged, under his own direction and that of his pupil and successor, Prof. Branting, till now it affords the means of treatment for hundreds of invalids, who resort to it from all countries, and to the youth of Stockholm gratuitous opportunities for going through complete courses of gymnastics. In the Institution are departments devoted to instruction in physiology, anatomy, including dissection and military training. Ling was elected member of the Swedish Academy, a dignity conferred only on the most eminent, and was honored by his sovereign with the special appointment of Professor and Knight of the Order of the North Star.

His "Elementary Principles of Gymnastics" was published after his death, in Swedish (Upsal, 1840). Several writers have since expounded his theories, as Rothstein in his *Gymnastik nach dem System des Schwedischen Gymnasiarchen Ling dargestellt* (Berlin, 1847–'51), and in his *Die Gymnastischen Freiübungen nach dem System Ling's* (Berlin, 1853); M. Roth, M.D., in a work entitled "Hand-Book of the Movement-Cure" (London, 1856); A. C. Neumann in his *Therapie der Chronischen Krankheiten vom heilorganischen Standpunkt;* and Dr. Charles F. Taylor, in a series of monographs published in the medical journals of New York, which are collected in a work entitled "Theory and Practice of the Movement-Cure."

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